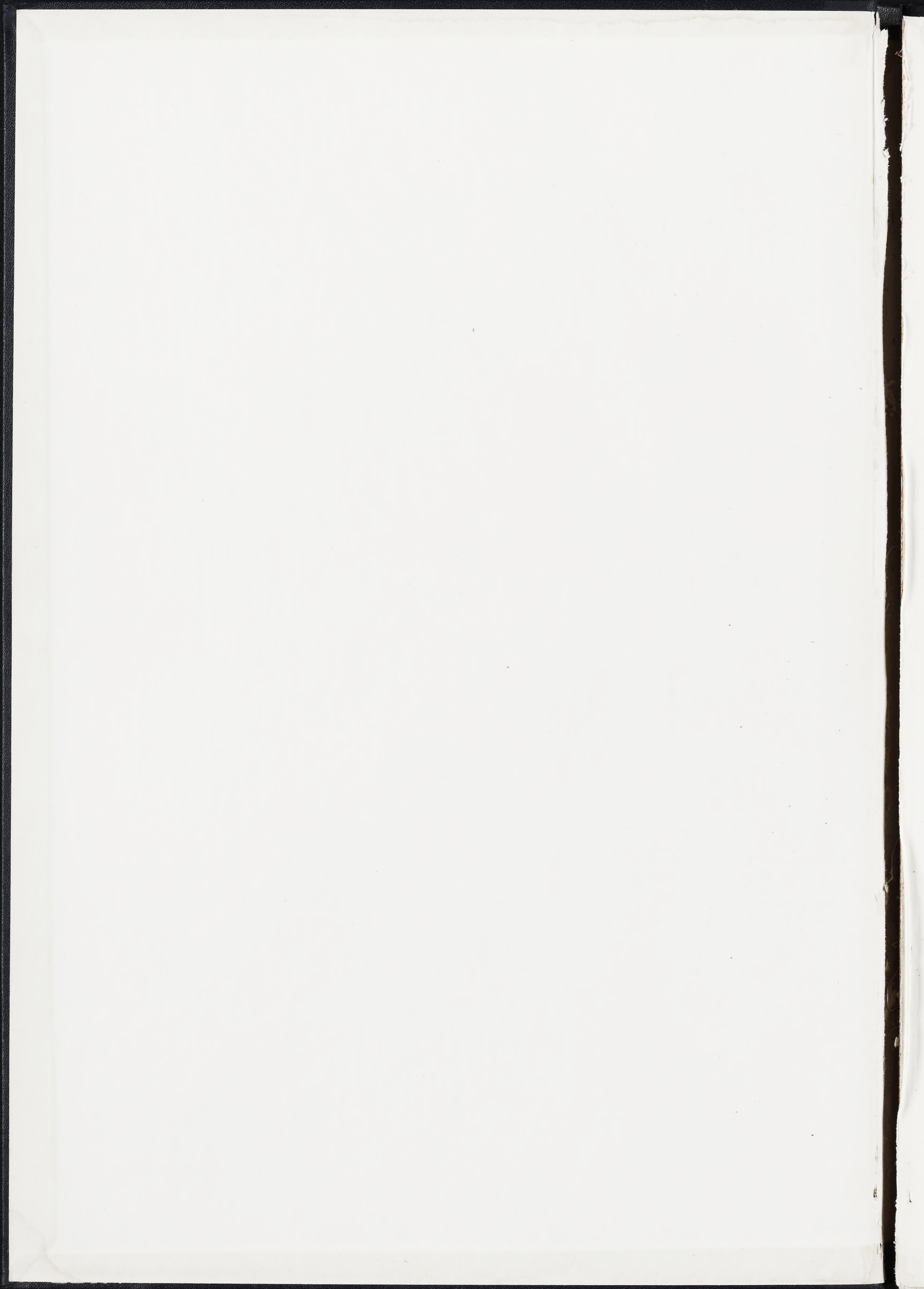


# NORTHROP NEWS

NORTRONICS

VOLUME XXIV







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# NORTHROP NEWS

NORTHROP NORTRONICS

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January 19, 1966

## OIL EXEC GETS TOP CORPORATE FINANCE POST

James D. Willson, Financial vice president of Tidewater Oil Company, has been named Northrop Corporate vice president—Finance, and chief financial officer, it was announced last month by Thomas V. Jones, Northrop president and chairman.



Mr. Willson

Mr. Willson had been with Tidewater Oil Company since 1959 and prior to that was vice president of Finance of the Norris-Thermador Corporation.

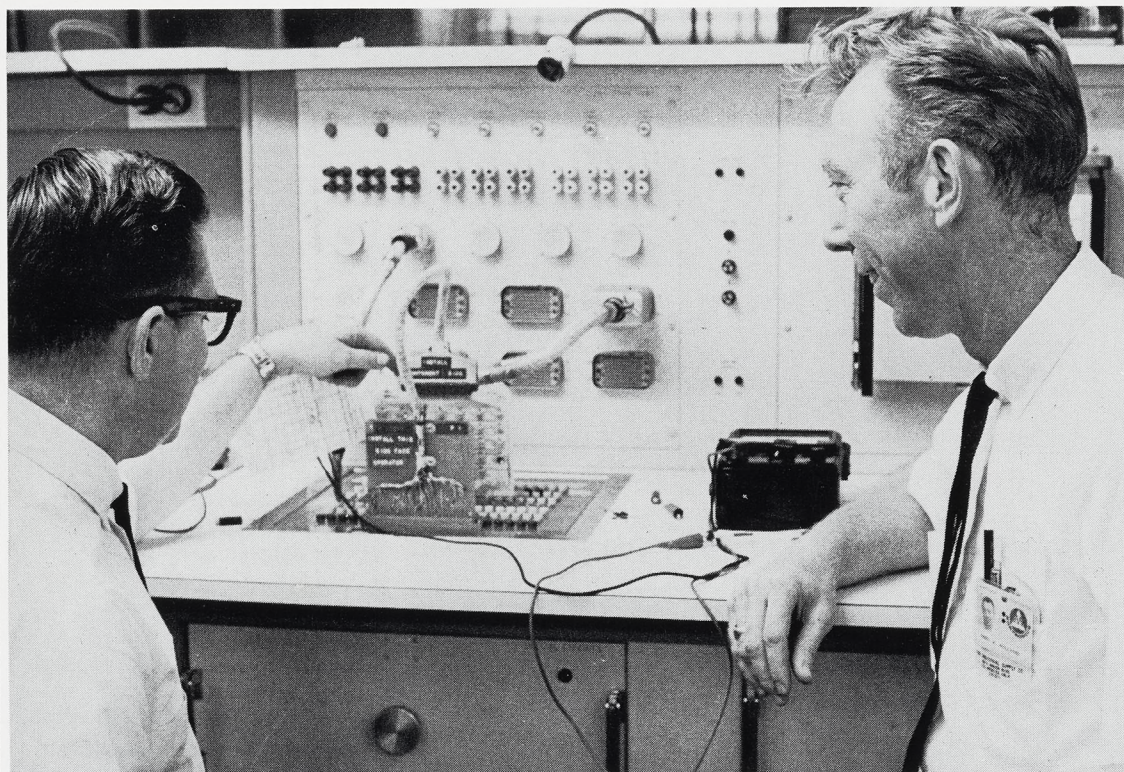
He has had a broad background in the financial, control and planning functions of industry and is the co-author of two books on corporate finance, "Controllanship" published in 1963, and "Business Budgeting and Control" published in 1956.

In 1959 he received the Lybrand Gold Medal Award from the National Association of Accountants for outstanding contribution to accounting literature.

## Follow-on Contract For Gyros Let

A contract totaling more than \$2.4 million for the follow-on production of auxiliary gyroscopes used in the Minuteman II inertial guidance system program has been awarded Northrop Nortronics by North American Aviation's Autonetics Division, Anaheim, California.

The single-axis, gas bearing gyro, which provides attitude reference information before launch to assist in orienting the missile for accurate flight, will be produced at Northrop Nortronics' Precision Products Department in Norwood, Massachusetts.



ULTIMATE INSPECTOR—Pat Higgins (left), test engineer, and Oren Williams of Inspection watch as Nortronics Automatic Test System (NATS) automatically checks out sub-assembly for TEAMS pre-production unit recently completed

at Anaheim. NATS is Nortronics-developed unit for automatic test of automatic test equipment (other TEAMS photos on page 6).

Photos by Bill Cox.

## TEAMS Unit Completed; Tests Begin

A pre-production TEAMS (Test Evaluation and Monitoring System) unit has been completed at Nortronics Anaheim and is presently undergoing an extensive evaluation program prior to full scale production of more than a score of the advanced automatic checkout units for the U.S. Navy Bureau of Ships.

Engineering design, documentation, testing, and fabrication of the initial unit required less than 10 months, and the over-all program is right on schedule, according to Project Engineer Hal Withee. Nortronics received the go ahead from the Navy last March and began fabrication in September. The unit was completed December 19.

TEAMS is designed to provide on-line monitoring of up to 10 major electronic systems aboard a new class of destroyer escorts beginning in late 1967. The TEAMS equipment is the newest application of the Nortronics DATICO concept of automatic testing.

Extensive evaluation of the pre-production unit is scheduled for the next nine months, Mr. Withee said. Included in this phase of the program are: simulated service tests to prove functional capability; maintainability tests to prove the unit's ability to automatically isolate faults; reliability tests to determine system mean time between failure; and environmental tests in such areas as shock, heat, vibration, humidity, and so forth.

Service and maintainability tests will be performed at Anaheim. Reliability and environmental tests will be conducted at Northrop Norair's environmental testing facilities.

Despite the extensive evaluation (See TEAMS, page 6)

## SERVICE PINS GO TO 23 VETERANS ON WEST COAST

Twenty-three Northrop Nortronics employees assigned to West Coast operations were honored for long Northrop service during January.

Receiving 15-year service pins were Katherine Jones, Nathan Grey, Robert Kissack, Thomas Stacks, Donald Hoff, Charles Brooks, Alan Campbell and Harlan Laurinat.

Ten-year service pins went to Paula Waer, Benjamin Kendall, Georgia Burman, Audrey Caldwell, Cornelius Ferguson, Ellsworth Waits jr., Salvador Verdugo jr., Fred Hulbrook, Merville Hyman, Clifton Davis, Charles Porterfield, Rice Evans, Stanley Grief, Frank Crandell and Jack Flood jr.

## New DOD Contract Office Is Step in Consolidation

A new Department of Defense office for administering contracts awarded by the three military departments and the Defense Supply Agency has been activated at Northrop Nortronics Anaheim facility.

It is called a Defense Contract Administration Services Office or DCASO.

The office, one of several to be formed under the Los Angeles Region, Defense Contract Administration Services, is responsible for performing post award administration services on defense contracts awarded to Nortronics.

Commander William D. Buckbee, USN, was named chief of the office by Colonel E. H. Robertson, past director of the Los

Angeles Region, DCASR. Brigadier General Arthur E. Exon, USAF, former commander at Wright-Patterson AFB, Ohio, took up his new post as director of DCASR in Los Angeles, January 1966.

Commander Buckbee heads a staff of approximately 30 persons, including many former members of the disestablished Resident Inspector of Naval Material (RINS-MAT) organization.

Activation of this office marks another step towards completion of a nationwide plan to consolidate field offices of the military departments and the Defense Supply Agency. The Nortronics office merges post award contract (See CONTRACTS, page 6)

## ARGENTINE SUB TO THE RESCUE

# Kwan Yin Caper: Three Months Before the (Broken) Mast

Maybe the most startling point in the Kwan Yin Caper is that its leading characters would do it again: Bob Peck, "without reservations"; Phil Akin, "with a few changes."

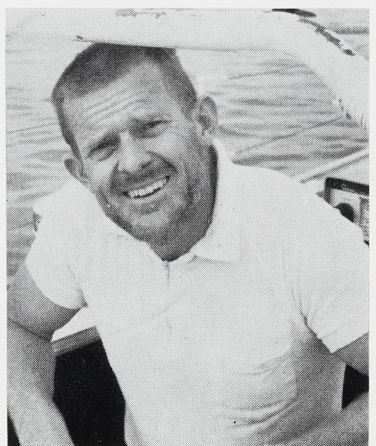
The caper—sailing a 58-foot ketch from Boston to Acapulco with an inexperienced crew during the worst weather of the year.

Although successful, it entailed sailing a third of the time in storms, one broken boom and a broken mast, an inoperative engine, malfunctioning radio, various other misadventures, and completing the last 380 miles under tow of an Argentine submarine.

Phil Akin, supervisor of Command and Control group at Nortronics Palos Verdes, bought the Kwan Yin (Goddess of Mercy) after a long search for just the right kind of vessel. He reasoned his experience sailing smaller

boats, the condition of Kwan Yin and luck would help him sail her from Maine to Los Angeles during a leave of absence.

Bob Peck, a Nortronics Anaheim artist, signed on as a crewman, hoping to make movies and



Mr. Akin

sketches for future oil paintings. He also took a leave of absence.

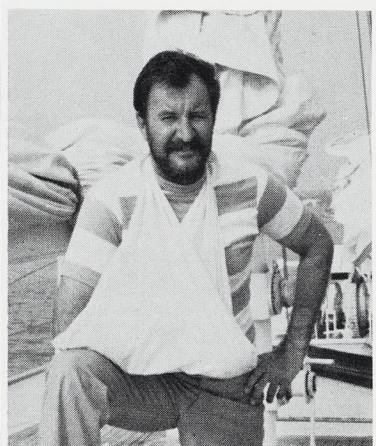
Jim Meagher and Lou DeBrigard of Northrop's Boston office, along with Mr. DeBrigard's son, helped bring the Kwan Yin to Boston from Booth Bay, Maine, and get her outfitted for sea. Mr. Peck and three other crewmen came aboard at Boston.

The journey began October 7 with the inexperienced crew getting its first taste of storms while still in Cape Cod Bay. The result: one broken mizzen boom, loss of a jib sail and a return to Boston.

Following repairs, the trip was resumed with more storms, high winds and high waves to battle as they beat their way to Port Washington, New York, then Newport News, Virginia. A mishap with a boom resulted in a mangled right hand for Bob Peck, limiting his services, and draw-

ing, for a time.

"Everyone cautioned us about rounding Cape Hatteras at this time of the year," Mr. Akin said. "We rounded it in beautiful weather with a sea like glass. What a relaxing time."



Mr. Peck

Two days later relaxation was out of the question and for six days they bucked 60 mph winds, 40-foot waves and fatigue.

"We tied ourselves in our bunks to sleep and lived off peanut butter, crackers and bananas, since cooking was out of the question," Mr. Peck added.

Clouds hid the stars and prevented navigation by sextant, so Skipper Akin steered by compass alone. After backtracking, the Kwan Yin arrived at San Salvador in high winds and in the dead of night.

"We had one man taking depth readings and another on lookout at the bow as we eased toward some distant lights," Mr. Akin remembers. "Suddenly the lookout shouted 'house trailer dead ahead.' We anchored right there. At daylight we discovered we were in the Cockburn harbor and

(See KWAN YIN, page 6)



## FOUR F-5'S FLY 11,000 MILES



Four new Northrop F-5's were delivered to the Imperial Iranian Air Force in Teheran late last month in the longest aerial delivery to date and the first under the Military Assistance Program. The aircraft were ferried 11,000 miles from Williams AFB, Arizona, by the 4441st combat crew

training squadron. Last October, a squadron of 12 F-5's made a 9000-mile deployment to South Vietnam. Northrop management representative at Williams, Hank Waklee, says goodbye to Captain Billy B. Gilbert, USAF.

## Warrick Heads AIA Committee Session

Gil Warrick, Northrop's supervisor of government reports, served last month as national chairman of the Aerospace Industries Association's Government Reports Committee meeting held in Tucson, Arizona.

Mr. Warrick is currently national chairman of this committee which includes representatives from the Department of Defense, NASA, Air Force, Army and Navy as well as major aerospace firms.

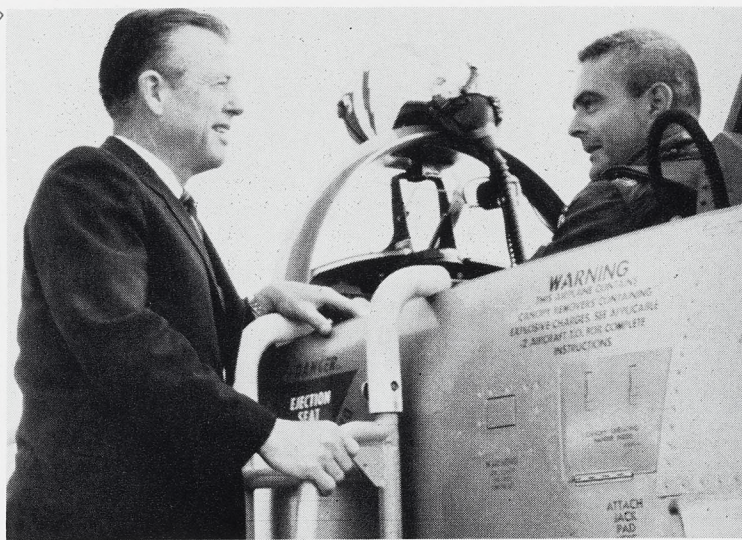
The Tucson meeting, held December 7-8 at the Desert Inn, drew 70 participants who concentrated on various problems related to business control systems involving reports submitted to governmental agencies.

## Dr. Fallis Organizing Aerospace Session

Dr. William B. Fallis, project chief of Hypersonic and Lifting Entry Project at Northrop Norair, has been named a session organizer for the first AIAA West Coast Aerospace Sciences meeting to be held in Los Angeles June 27-29, 1966.

Dr. Fallis' session is on entry vehicles.

The Aerospace Sciences meeting, which also covers such subjects as atmospheric environment, astrodynamics, and atmospheric flight mechanics, is planned to be similar to the annual January meeting in New York.



## CRAIG, MUNSEN, BAGBY CHAMPS IN CHRISTMAS GOLF TOURNAMENT

Mike Craig, Bob Munsen and Bob Bagby were over-all winners of first, second and third flights in the all-Northrop Christmas golf tournament held December 27-28.

Played on consecutive days over the Los Verdes and Harding courses, the event drew 120 par chasers representing all Northrop divisions in the area.

Mr. Craig's 69-70-139 net total was one stroke better than the 140s posted by Dick Geer and Bob Pratt and the 142 logged by Virgil Wilson.

Mr. Munsen's net 137 in the second flight was followed by a three-way tie between Ted Fujimoto, Tut Kadowaki and C. Willett, all with 141s.

Dick Teel and A. Weddell trailed Mr. Bagby's 143 in the third flight with 144s, with Lou Villalba posting a 145.

Individual round winners were not allowed to garner prizes for two days, but were eligible for over-all laurels.

Mr. Wilson, Mr. Geer, Lou Drazin and Mr. Craig finished in that order in the first flight at Los Verdes. In the second flight the placings were Mr. Willett, Mr. Kadowaki, Charles Chamberlin and Bill Mahlman. Mr. Weddell, Bob Sanders, Mr. Teel and Matt Peckham placed in that order in the third flight.

At Harding, Tom Williams, Rollie Pierce, Ted Hallett and Joe Seman finished in that order in the first flight. Mr. Munsen, Mr. Fujimoto, Ray Freed and T. Gentle, took honors in the second flight respectively, while Mr. Bagby, Mr. Villalba, Charles Openlander and Joe Kalina placed in that order in the third flight.

## AD ASTRA PER ASPERA

## Mock Contract Negotiation To Explain Complexities

By the Northrop News Staff

One of the most unusual, educational—and perhaps entertaining—programs ever staged by a defense aerospace-oriented professional society is scheduled February 4 by the National Contract Management Association at the Airport Marina Hotel in Los Angeles.

Industry and government contract representatives are going to sit down at a conference table and actually negotiate a mock government contract, with an expected 400 partisans looking on.

The day-long meeting is an educational conference designed to present the "latest and best knowledge regarding the negotiation of changes and terminations to multiple incentive contracts."

NCMA put on a similar program in 1964 at which a multiple incentive contract (MIC) was negotiated. This year's event will see a moderating panel negotiate changes and terminations to that same contract.

Northrop's Dan Harnett, Corporate director of Contracts and Pricing, will join Howard W. Neffner, Boeing vice president, and Colonel H. A. Budd, Air Force Ballistic Systems Division, or the panel, which is headed by Brigadier General Joseph E. Bleymaier of Air Force Western Test Range.

According to Mr. Harnett, the Department of Defense and National Aeronautics and Space Administration are continuing a major emphasis on multiple incentive contracting.

MIC allows for a greater profit by a contractor for his performance in several areas, such as performance, cost savings, and schedule.

Launched in 1960 as an experiment by the DOD, MIC is "a way of life today," Mr. Harnett said. NCMA is only a year older than MIC, but has mushroomed in membership and professional stature in a short time.

One good reason for its growth is its educational conferences, such as the one next month, which come at a time when contract negotiations are more complex and critical than ever before.

The hypothetical case, by the way, was developed by Donald L. Somers, of Peat, Marwick,

Livingston and Co. A contracts and planning consultant, Mr. Somers also developed the case which was presented by NCMA in 1964.

—C. R.

## THEY'D WALK A MILE FOR A \$3 SCR

It's been over two months now, but seven engineers at Nortronics Palos Verdes are still looking for \$3 SCR's.

What's an SCR? It's a silicon control rectifier. It fits into an electronic subsystem known as an automotive transistorized ignition kit.

It's supposed to make the points, spark plugs and gasoline in your car last longer.

The men have bought most all the components for their kits except the SCR's. They could order the part for \$18, but it seems one of the guys found one for \$3. Now the rest believe they can do as well so the hunt is on.

If anybody's got four or five \$3 SCR's on hand they don't need, call Mike Long, John Lefingwell, Herb Stark, Don Marden, Jerry Mandel, John Crowley, or Dick Flude. They may give you as much as \$3.25.

Meanwhile, Ken Barlow, who bought his SCR with the original kit, has the only working transistorized ignition of its type on the block at Number One Research Park.

—B. S.

## AND IN CONCLUSION...

John Hill of Norair's Manufacturing Engineering presented a paper on "Cold Forming of Titanium and Similar Metals Using Polyurethane" to the Plastics Tooling Division of the Society of Plastics Industry in Los Angeles. He has been asked to give the paper again in March when the 23d annual conference of the SPI Western Section convenes in Palm Springs. Lois Paris, secretary in Manufacturing R&D, is serving her second elected term as secretary to the SPI's Plastics for Tooling Division, Western Section.

The Journal of the Society of Photo-optical Instrumentation Engineers contains an article by Nortronics' Walter M. Clark, senior engineer at Palos Verdes. Mr. Clark's paper, presented orally to the 10th SPIE technical symposium last August, is on photometric standards.

Certain aspects of Norair's lifting body research vehicle studies will be described in a paper authored by M. S. Cahn, J. R. Stevens, G. M. Andrew and J. R. Garcia, next week at the AIAA third Aerospace meeting in Los Angeles. C. R. Hall will discuss boundary layer research at the same meeting. Northrop Ventura will contribute a paper on Apollo Recovery System Dynamic Analysis by R. E. Eriksen. Dr. Morrie Neustadt, Joe Guiteras and J. A. Larrivee.

Northrop Space Laboratories' Huntsville facility is sending Dr. Steve Hu and M. L. Thompson who will present a paper on optimal spaceflight guidance functions.

## IN CHRISTMAS EVENT

## Norair, Nortronics Keglers Divide Most Laurels

Honors were about evenly divided between participants representing Norair and Nortronics December 11-12 in the all-Northrop Christmas Bowling tournament sponsored by NRC.

Only one Northrop Ventura man, Tony Piscuskas, was able to break into the top ranks from among the small entry from that division.

Frank Blair, Ron Beye and Bud Wegnes, all Norair, placed in that order in the men's "A" singles event. The "B" event

found honors going to Drex Carlson of Nortronics, Mr. Piscuskas, James Billings and Ron Kelley, both Norair, respectively.

Mickey Tomblin and Flo Oehler of Norair Palmdale placed one-two in the women's "A" singles followed by Sylvia Pearson, also of Norair. Dona Smith and Jean Arrasmith of Nortronics took first and second in the "B" singles trailed by Betty Stolz of the same division.

Mrs. Arrasmith and John Meyer team for "A" doubles hon-

ors, followed in order by Bud Wegnes and Nancy Fujikami (Norair), Eli Cowdray and Ann Lichney (Norair-Nortronics), and Bill Myerson and Elaine Dower (Norair-Nortronics).

Mixed "B" doubles fell to Nortronics' Lew Lantz and Marge Lantz, followed by Norair's Ron Kelley and Carmela Moniello and Tom Weaver and Oliver Weaver of Nortronics.

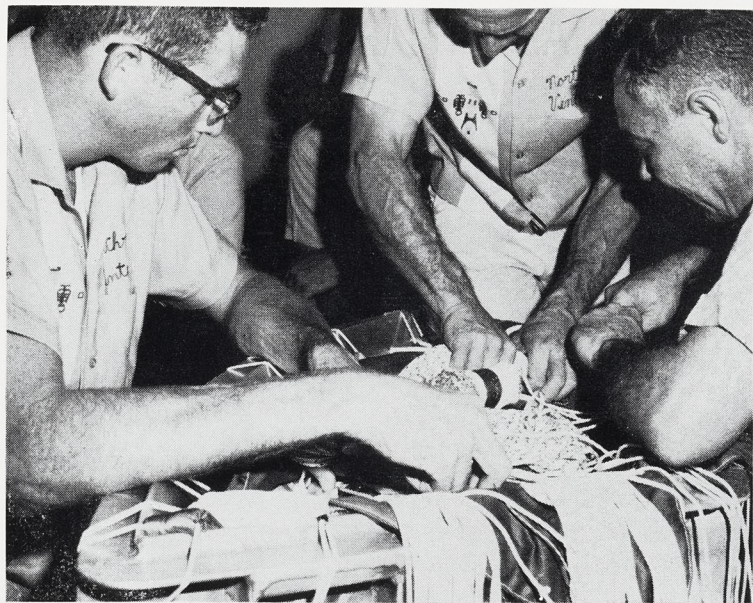
Del Young and Robert Kocher of Nortronics copped men's doubles "A" honors, followed by two

Norair teams composed of Frank Blair and Earl Guisinger, George Fujikami and Bud Wegnes, and the Nortronics entry of R. C. Dopf and R. Arrasmith.

Men's "B" doubles went to Norair's Orville Call and Herb Ripley trailed by Howard Hill and Norm Norfjor of the same division. Nortronics' Stan Apo and Alan Gyotoky and Lew Lantz and Loren McAnelly finished third and fourth.

Nancy Fujikami and Donna (See BOWLING, page 5)





(5) Flaps together



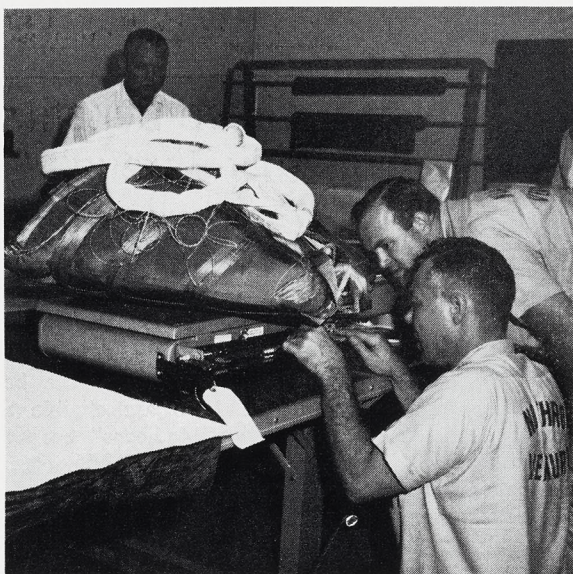
(6) Pack closure



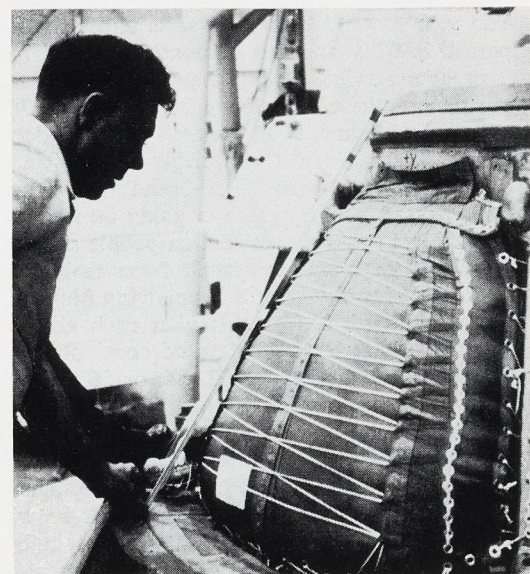
(7) Reefing cutter check



(4) Reefing line splice



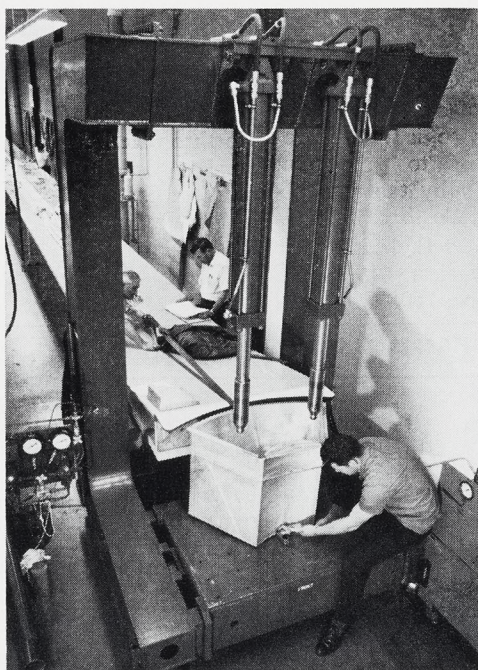
(3) Weigh in



(8) Ready to go



(2) Risers in



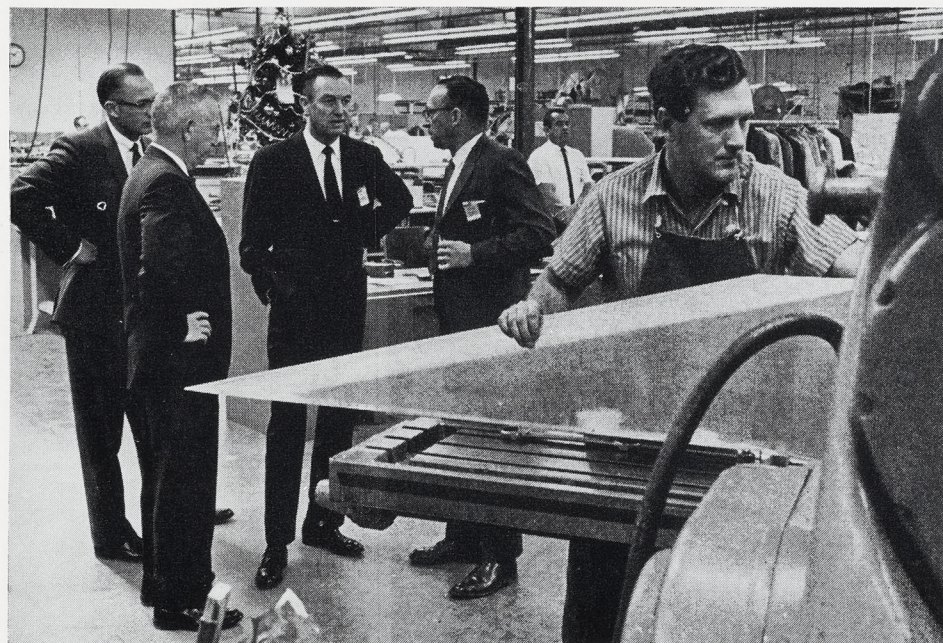
(1) Can ready

## APOLLO PACKING SEQUENCE

Main parachutes for Apollo earth landing system are packed by procedure that took more than three years to develop. Photo sequence, roughly clockwise, reveals the work of skilled Northrop Ventura packers. (1.) Main canopy stretches along packing table ready to be pressed into can by twin 30,000-pound rams. From left, Clarence Bennett, Woody Stone and Chuck Kennedy get set. (2.) Specially developed pressure plates for ram lie on tables near Dick Cary, Wendell Shaw and Orrin Reed. (3.) Completed pack is weighed to double check that nothing that shouldn't be inside is inside. From left are Elmer Newsome of Bendix, John Simpson and Bill Downs, at Kennedy Space Center. (4.) Taswell Payne splices ends of reefing lines. (5.) Folding of flaps before lace-up is carried out by (from left) Larry Richardson, Taswell Payne and Mr. Downs. (6.) Critical step is pack closure and involves (from left) Orville Reed, Northrop Ventura base administrator of El Centro Test Facility, Mr. Cary, and Charles Stiles, with Ned Druhet learning procedure. (7.) If Hal Warren (right) feels cord move as Moe Avena pulls, than none of reefing cutters have fired. Cord runs through in front of each cutter blade. (8.) Mr. Downs checks pack installed on boilerplate for test that occurred late in 1965 (photos by NASA, Northrop Ventura).



Members of Junior Achievement firm, Custom Craft, sponsored by Nortronics Hawthorne, have panoramic view of F-5 and T-38 production lines during recent tour of Northrop Norair.



Both Nortronics and Ventura divisions were hosts to a brief tour of facilities by Northrop President and Chairman Thomas V. Jones just before the holiday vacation. He had a "hello" for Ron Harrison (left photo), who is here shaping a wing for one of Ventura Division's target drones, while M. A. Maurer, vice president—Production briefs Mr. Jones on Production activities. At left is H. E. Riggins,



vice president—Administration, and George Douglas, Corporate vice president and Ventura general manager. At Anaheim (right photo), Mr. Jones chats with Bill Gramm, at right, foreman of Mechanical Assembly and Test branch, and Nick Niccole, superintendent of Assembly and Test branch. Grant Gunderson, chief of the Production group, is at left.



## FRINGE BENEFITS

## Hourly Personnel Get Savings Plan



By WILLIAM LARRABEE  
Vice President—Industrial Relations

Now that the holidays are over and we are back to work, it's time to start talking again about our Northrop fringe benefits.

You will remember that in the last article on this subject we covered a new phase of our early retirement program known as the "Magic 85" formula. It will be recalled that generally speaking under this formula if an eligible person's age plus his length of continuous service equals 85 he can retire early with his full benefit earned to the time of his actual retirement, and that if he falls short of 85 points, his earned benefit is reduced by only two and one-half percent for each point he is short.

A good many people have inquired as to whether parts of years count in this computation. The answer is that they do. The year is divided into 12 parts under the formula. Hence, if a person is 62 years plus 6 months old and he has 22 years plus 2 months service, he will have his 85 points. If he is 61 years plus 2 months old and has 21 years plus 7 months service, he will have 82 and 9/12 points. The full details of the formula will be published just as quickly as possible.

Let us go on now to a brand new benefit for our eligible hourly-rated people which is going into effect as of February 1, 1966. Northrop believes that its people should have every chance and encouragement to benefit from their own individual efforts and in conformity with this policy an Hourly Savings Plan is being established. Under this plan each eligible hourly-rated employee with at least 30 days of continuous service may authorize payroll deductions of \$2, \$4, or \$6 per week.

These funds are forwarded by the company to the trustee under the plan, the Manufacturers Hanover Trust Company in New York, and are invested by the trustee. The individual involved may specify whether he wishes his deductions invested 100 percent in bonds or 50 percent in bonds and 50 percent in common stocks. The trustee is not permitted to invest any employee money in Northrop stock. The company matches the employee's contributions with 50 cents for each employee dollar. This 50 percent company contribution is invested by the trustee only in Northrop stock. The company pays the expenses of administration of the trust over and above its 50 percent contribution.

When an employee's connection with the company is severed for any reason, he becomes entitled immediately to receive the value of his own contributions as computed under the plan. Hopefully, with such good investment service as is provided by the trustee, he will have a profit. In addition, if his severance is

(See FRINGE BENEFITS, page 5)



Mr. Miller

## HAWAIIAN ADVENTURE



These 94 Northrop employees and families joined in the yearend holiday trip to Hawaii sponsored by Northrop Recreation Club. Tours of Maui, Hawaii, Kauai and Oahu

islands were included in the visit, and a grand time was had by all, according to Jeanne Andrecht, Travel Club commissioner at Nortronics.

## Medicare Benefits to Be Available In July Through Social Security

Northrop Corporation employees who have already observed their 65th birthday are being urged to apply for their benefit rights by the Social Security Administration.

Those 65 or over at the beginning of 1966 are eligible to receive new "Medicare" benefits beginning July 1, 1966, even though they continue to work.

However, each individual must apply for these benefits through the Social Security Administration prior to March 31, 1966.

To assist eligible individuals, and especially those who are currently employed, the Social Security offices in the greater Los Angeles area have arranged special evening hours of operations. This convenient service is being provided from 5:30 to 8:30 p.m. each Wednesday by the area offices which include those at:

Inglewood, 608 E. Manchester Blvd.; Los Angeles, 419 South Hill St.; Torrance, 1408 Crenshaw

Blvd.; Santa Monica, 1514 Sixth St.; Van Nuys, 4631 Van Nuys Blvd.; and Santa Ana, 1438 East First Street. These and other Social Security offices are open Monday through Friday from 8:30 a.m. to 4:30 p.m.

The Long Beach office, located at 1235 Pacific Ave., will remain open Thursday evenings from 4:45 to 6:45 p.m.

The Ventura office, at 4274 Telegraph Road, will be open from 5:30 to 8:30 p.m. on both Wednesday and Thursday evenings.

No evening hours have been scheduled by the Lancaster office.

Northrop employees desiring additional help or who have questions on Social Security or the Northrop Retirement Plan are invited to contact the following Retirement Counselors: David Cocks at Norair; Betty Albright at Northrop Ventura; or Harry Belcher at Northrop Nortronics (Anaheim).

## World Tour Planned For 33 Days in Fall

Reservations are now being accepted at Personnel Activities offices for an NRC-sponsored "around-the-world" tour next fall.

Departing September 2, the 33-day excursion will include visits to Hawaii, Japan, Hong Kong, Bangkok, India, Pakistan, Lebanon, Jordan, Egypt, Turkey, Greece and the Greek Islands.

Total cost is \$1495.

## Travel Clubs Sponsor Junket to Mexico

Reservations are now being accepted at Northrop Personnel Activities offices for a 15-day tour of Mexico departing April 29 under joint sponsorship of NRC Travel Clubs.

The tour will include stops at Mexico City, Xochimilco, Cuernavaca, Taxco, Acapulco, Guadalajara, Puerto Vallarta, and Mazatlan.

Total cost is \$320 per person.

## BUT IT'S THE WOOD TAPPING THAT COUNTS

# Joe Rashid Family Has the World on a String

Violin making is an ancient art, more than 400 years old, but even in this age of expanding technology the old names like Stradivarius still stand for the best in stringed instruments.

The variables in violin making, according to Joe Rashid, are such that it is extremely difficult to include the desired acoustic characteristics in an instrument.

Mr. Rashid, who recently began work as an engineering specialist in the Thermal Structures and Propulsion group at Northrop Space Laboratories, has been playing and making violins for 33 years. A Northrop employee since 1947, he had been at Nortronics Palos Verdes the last five years.

Not only is it difficult to produce good stringed instruments, he reports, but it is almost as hard merely to match the characteristics of an older violin of respected quality.

"One of the required techniques," Mr. Rashid explained, "is to avoid trying to duplicate exactly the thicknesses of the wood in the older violin. It's more important to compare the vibration frequencies of each piece with the disassembled parts of the successful instrument."

"By tapping a violin top and

back along two selected axes I can evaluate the acoustics. As I work the wood I can compare the new parts with those of an older violin I know is a good instrument."

Testimony to the success of his theory is the attitude of Detroit Symphony Concert Master Joseph Gingold.

Mr. Gingold used one of the Rashid violins in the orchestra and when his offer to buy the in-

strument was declined, the conductor permitted Mr. Rashid to make copies of his 1683 Stradivarius.

Mr. Rashid started duplicating the rare old instrument by carefully measuring its physical dimensions.

When work was begun on the duplicates, he applied his acoustical technique, shaping and cutting the spruce front and maple

back until the resonances were matched as closely as his ear would permit.

In this manner he has produced several copies of the 282-year-old violin.

Mr. Rashid had to provide his own violin making tools, since none of the special tools required are manufactured. Using a hard wood known as lignum vitae he has prepared miniature planes, a whole set of which will fit in

his palm.

The final carving of the carefully selected wood requires half-moon shaped steel blades about three inches across prepared by him. The violin patterns also were made by him.

His cello was played in the Los Angeles Philharmonic by the first desk cellist, Nino Rosso, during a broadcast concert. World-famed Gregor Piatigorsky has played it on several occasions and pronounced it "excellent".

A viola made by him received high praise from the renowned violist, William Primrose.

The five Rashids, Joe, his wife, Lee; Robert, 15; Carol, 14; and Billy, 11; all play one stringed instrument or another in chamber music concerts at home. Lee Rashid, who was a professional violinist in Springfield, Massachusetts, plays the viola, Robert the cello, and the two younger children the violin.

Robert has won a first prize in a contest for strings and when he was only 11, joined the Beach Cities Symphony, to which Mr. Rashid also belongs.

Carol is concert mistress of the Dodson Junior High School orchestra, and Billy is concertmaster of the Crestwood School orchestra.



Stringed instruments run in the family, according to Joe Rashid of NSL, who has made some 20 of them in 33 years. Watching him start spruce front of another violin



In left photo are his son, Billy, 11, and daughter, Carol, 14, who also play chamber music at home with brother, Robert, 15, and Mom, Mrs. Lee Rashid.



To place an ad in the Northrop News, obtain classified ad form C67 from your organization clerk and mail the ad to Northrop News, 170, Beverly Hills.

Classified

Deadline is noon Wednesday, one week before publication. Ads are limited to one item. The Northrop News reserves the right to edit or omit ads.

**For Sale**

**Volkswagen**, 1963, radio, w/s/w, many other extras, low mileage, \$1395. San Pedro, TE 1-2654. A

**Australian Silky Terriers**, champion sired, AKC reg., no odor or shedding, shots, \$150. Inglewood, PL 7-1640. A

**VW 1200 sedan**, 1964, 22,500 miles, windshield washers, heater, \$1250. L.A., 476-1635. A

**House**, 4-bdrm., family room, 2½ baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

**Cemetery Lot**, Inglewood Park, Sunrise sec., \$450. Inglewood, 674-5579. A

**International Travelall**, 1963, V-8. H-D 5-spd. trans., air conditioning, r/h, 21,000 miles, many extras, \$2195. P.V., 377-1075. A

**House**, 4-bdrm., 1770 sq. ft., 3-yrs. old, \$36,500. Torrance, 327-2666. A

**Ski Boots**, boy's size 3, dble., \$10. Norco, 735-1232. A

**Vacuum**, Kenmore Magicord w/powermate rug attach., powermate has own elec. driven motor for rotary beater-sweeper action, 1-yr-old, \$50. Hawthorne, 676-6122. A

**Ford Tudor**, V-8, 1951, \$75. Downey, TO 9-2673. A

**Exercycle**, \$300. Brea, 529-3531. A

**Range**, top grill, burners & 2 ovens, Western Holly, \$85. Hermosa Bch., FR 9-7342. A

**Tape Recorder**, all-transistor battery operated, \$9.90. Hawthorne, 676-0418. A

**Ford coupe**, 1948, 283 Chevrolet eng., new interior, \$1100. Torrance, FR 8-1350. A

**Receiver w/speaker**, NC-300, 160-10 meter, headphones & manual, \$160. San Pedro, TE 3-9696. A

**Clothes Dryer**, new heating element, \$30. Long Bch., 596-1280. A

**Stove**, O'Keefe & Merritt, griddle, auto. oven timer, sep. adjustable broiler, \$65. Manhattan Bch., 379-2649. A

**Lamp Set**, table-type, modern, \$20. Inglewood, OR 3-1189. A

**Drafting Machine**, Bruning-Wallace, upper arm 30", lower arm 24", \$40. Redondo Bch., FR 6-6415. A

**Ford**, 1951 Custom 4-dr., r/h, good tires, new battery, elec. safety door locks, \$100. Redondo Bch., FR 5-3914. A

**Ski Boat & trailer**, 14' fibreglass over plywood, 50 h.p. Mercury eng., elec. starter, speedometer, ski hook, night lights, \$450. Torrance, FR 1-1125. A

**Ford**, 1950, Starliner, 427, tri-power-4-spd., many extras, \$1200. Torrance, 324-8789. A

**Lathe**, Powerkraft Logan, 10"x24" w/milling attach., chucks, & large assort. of related tools, \$175. Arcadia, 446-1887. A

**Fiat**, 1953 Topolino, convt. coupe, 4-cyl., o/head valve, \$500. Riverside, 689-7678. A

**Metropolitan**, 1955, \$175. Torrance, FA 8-3041. A

**Bicycle**, boy's 26" Schwinn med. weight, \$13. Torrance, FA 8-3306. A

**Buick Skylark**, 1962, 2-dr. h/top, b/s, p/s, p/b, r/h, factory air cond., 1-owner, approx. 35,000 miles, \$1595. Torrance, FR 8-4301. A

**Ford**, 1957, sta. wag. 9-pass. r/h, Fordo., new tires, battery, \$210. L.A., 756-0015. A

**Camera**, Leica 3C w/f. 2.0 Summar lens, Steinheil 135 mm tele. lens, cowhide cases, \$75. Costa Mesa, 714-546-5341. A

**VW Sundial camper**, 1966, split seats, AM/FM radio, complete, 2500 miles, \$3150. Redondo Bch., FR 5-2156. A

**Piano**, restyled upright w/mirror, walnut, \$150. Fullerton, LA 5-5868. A

**HO Train Set**, \$85. Anaheim, 714-KE 5-6296. A

**Mercury**, 1955, 2-dr., all power, \$125. Torrance, DA 4-8663. A

**House**, 2-bdrm., dining room, fireplace, dble. garage, \$21,750. Inglewood, OR 1-3860. A

**Cemetery Lots**, dble. interment, Inglewood Park, El Portal sec., \$800. P. V. Pen., 377-1180. A

**Thunderbird**, h/top, 1959, \$1050. Redondo Bch., 374-7956. A

**Ford wagon**, V-8, 1954, auto. trans., r/h, \$175. L.A., 254-9964. A

**Chevrolet**, 1956, new auto. trans., r/h, \$115. Playa del Rey, 391-8072. A

**172 Flying Club**, no initiation, \$25 mo. plus \$6 hr. wet rate. L.A., VE 7-9813. A

**Buick**, 4-dr. Roadmaster, r/h, p/s, p/b, \$275. Buena Pk., LA 1-4711. A

**VW**, 1965, w/sun roof, radio & seat belts, low mileage, \$1685. Long Bch., 633-5938. A

**House**, 2-bdrm., h/wood floors, interior recently painted, patio w/built in barbecue, consider lease w/option to buy, \$16,000. Torrance, FR 1-0629. A

**Barbecue**, portable, w/electric, spit & hood, \$5. Torrance, DA 5-5245. A

**Chevrolet**, Super Sport cpe., 1964, V-8, auto. trans., p/b, p/s, p/w, new tires & brakes, \$2200. Hawthorne, OS 5-6831. A

**Surfboard**, Rick, 9'4", \$95. Lomita, DA 6-6214. A

**Pontiac**, 1959 4-dr., \$425. Torrance, 329-8406. A

**Valiant**, 1951, 4-dr., big 6, r/h, auto. trans., 26,000 act. miles, orig. owner, \$875. Lawndale, 676-3050. A

**For Sale**

**Mercury**, Monterey, 1960, 2-dr., r/h, new w/s/w tires, auto. trans., \$450. Hawthorne, 675-5215. A

**Wire Wheels**, 2 19", suitable for MG PA, MG J2, MG TC, \$10 ea. Torrance, 375-0449. A

**Bicycle**, boy's 26", \$5. Lawndale, OS 9-0876. A

**Buick Special**, 1957, auto. trans., p/s, p/b, \$150. Hawthorne, OS 9-2710. A

**Chevrolet**, 1958, p/s, auto. trans., V-8 eng., push-button radio, heater, \$577. Hawthorne, 676-4837, 676-9989. A

**Plymouth Fury**, 1964, 2-dr. h/top, p/s, p/b, r/h, \$1600. Redondo Bch., 374-2915. A

**Austin**, 1959 Cambrian model, 4-dr. sedan, b/s, 4-spd., low miles, \$350. Gardena, 327-0662. A

**Ford Galaxie 500**, 1962, 2-dr., p/s, p/b, r/h, \$1050. Lynwood, NE 5-3824. A

**Refrigerator**, 1955, 10 cu. ft., copper tone, \$70. Gardena, 679-3927. A

**Volkswagen**, 1963, 23,000 miles, \$1250. P.V. Estd., FR 5-9985. A

**Chevrolet**, 1953, convt., stick, r/h, tonneau cover, \$195. Torrance, 327-4585. A

**Magnatone custom 480 amp.**, w/50 watt stereo guitar amp w/reverb. & echo chamber, Echo Fonic, hvy. duty speakers, 2 12" & 2 6" ovals, \$385. Long Bch., GA 3-0373. A

**Freezer**, Kenmore, frostless, 6-mos-old, \$175. Hollydale, ME 3-2395. A

**Truck Mirrors**, 5"x10" Coronado stainless steel, tinted glass, \$10. Gardena, OS 6-3726. A

**Record Player**, Norelco, \$25. Lynwood, NE 1-9322. A

**Honda**, 1964, 150 cc, extras, \$350. Lawndale, 675-4305. A

**Ford Galaxie 500** s.p., h/top, 36,000 miles, factory air, \$500 equity & take over 15 pymts. of \$63.89. Inglewood, 753-3979. A

**Desert Property**, 2½ acres near 29 Palms, accessible by roads, ½ mile from 29 Palms Hwy., electricity & phones avail., \$950. Torrance, 378-5922. A

**Cadillac**, 1941, 4-dr., \$100. Inglewood, OS 5-1558. A

**Corvair Monza**, 1962 tudor, air conditioned, r/h, new w/s/w, \$995. Torrance, 329-1293. A

**Bicycle**, 20" boy's, \$8. Lennox, OR 2-2370. A

**Ford pickup truck w/camper**, sleeps 4, \$350. Lawndale, 679-8426. A

**Ford Station wagon**, Fordomatic, p/s, orig. owner, new tires & brakes, 51,900 miles, \$700. Sepulveda, 894-8490. A

**Land**, 40 acres in Xmas Valley, Ore., level, 7 miles to lodge, \$150 acre or \$5000. Lennox, OR 7-3788. A

**Volkswagen**, 1961, r/h, extras, \$850. Camarillo, 805-482-6125. A

**Wall Heater**, dble.-side, gas, 45,000 BTU, \$25. Paramount, ME 0-5562. A

**VW 1500S** sq. bk. sedan, 1965, r/h, \$1950. Torrance, DA 3-6018. A

**VW**, 1500S Variant sunroof, 1964, w/s/w, r/h, many extras, \$1925. L.A., 478-5732. A

**Rambler**, 1958, 4-dr. sedan, new tires, brakes & radiator, r/h, 48,000 miles, \$390. L.A., EX 8-6375. A

**T-Bird**, 1956, h/top, recent overhaul & paint, good tires, auto. trans., 1-owner, \$1295. Pacific Palisades, 454-2057. A

**Mercury Monarch**, 1959 2-dr. h/top, \$400. Lawndale, 370-3230. A

**Lincoln Premiere**, 1956 w/Continental kit, \$175. Harbor City, 326-1409. A

**T-Bird convt.**, 1961, full power, air conditioning, \$1200. P.V., FR 7-5439. A

**MG Midget**, 1964, take over 17 pymts. at \$71.78 mo. or \$1400. Box 2301. A

**MGA**, 1958, r/h, custom top, tonneau & paint, \$950. Playa del Rey, 398-1458. A

**MG-B**, 1965, wire wheels, o/drive, r/h, tonneau cover, 1-owner, \$2425. Hawthorne, 679-2488. A

**Comet**, 1962, 4-dr. std. shift, new battery, tires, brakes, \$850. Ftn. Valley, 847-0575. A

**Dump Truck**, 5 yd. bob tail 1957 Chevrolet, \$1700. Thousand Oaks, DI 0-8730. A

**House**, 2-bdrm, custom, panelled kitchenette, covered patio, 2-car gar., 15'x35' filtered & heated pool, Alcoa alum. siding, corner lot, \$23,500. Lakewood, HA 5-6844. A

**Land**, Antelope Valley, 5-acre parcels near Willow Springs, \$520 acre, terms. Torrance, FR 8-1026. A

**Ski Boots**, LaDolomite, dble. boot, men's size 7D w/boot press, \$25. Manhattan Bch., 379-7831. A

**Golf Clubs**, 1965 Wilson staff irons, 2-9, D-2, reg. shafts, G-grips, \$80. Manhattan Bch., 379-4437. A

**Bicycle**, Schwinn 8-spd. racer w/generator light & rack, \$45. Long Bch., 433-2202. A

**House**, 3-bdrm. & den, new kitchen, completely redecorated, lge. fenced yard, fire place, \$17,950. L.A., OR 4-0366. A

**Bicycle**, Derailleur, 21", 10-spd., Schwinn, \$55. Inglewood, OS 6-0573. A

**Bedroom Set**, blond, twin beds on frames, chest-of-draws. & large dresser, \$75. L.A., OS 6-9855. A

**For Sale**

**Golf Clubs**, Pro-line, matched set, 10 irons & 4 woods, 6-mos-old, \$85. Hawthorne, OS 6-8997. A

**Range**, Gaffers & Sattler, gas, w/auto. clock timer, \$70. Lakewood, 867-0593. A

**Wedding Dress**, custom-made, lace o/bridal satin, \$50. Redondo Bch., 370-7213. A

**Dining Room Set**, table & 6 chairs, \$60. Inglewood, 671-4064. A

**Cadillac**, 1957, convt., all power, new top good tires & mechanical, \$500. Torrance, 375-1756. A

**TV**, Zenith, 23", table model w/wheeled stand, VHF plus channel 28, \$65. Pacific Palisades, 454-1963. A

**Range**, gas, Magic Chef, copptone, 4-burner, auto. oven & timer, 1-yr.-old, can be built-in, \$175. Redondo Bch., 375-3266. A

**Enlarger**, 4x5 Federal condenser-type, access. diffusion glass to replace condenser, 2-tongs, 3 hard rubber trays 10"x12", 5-spd. easels, many extras, \$50. Compton, NE 5-3294. A

**Bassinet**, used 6 wks., large, dressing table top, collapsible legs on rollers, \$10. Long Bch., GA 3-4837. A

**Ford station wagon**, 1959, air conditioning, r/h, auto, p/s, p/b, w/s/w, other extras, \$495. L.A., 474-3433. A

**Motorcycle**, 1965, B.M.W. 500 cc, 6000 miles, dble seat, roll bars, luggage rack, & windshield, \$1095. L.A., 939-7834. A

**Chevrolet Biscayne**, 1961, 6 cyl., stick shift, w/s/w, r/h, seat belts, orig. owner, \$675. Hawthorne, 675-0891. A

**Home**, 3-bdrm, 1½ bath, R-2 corner, 20 min. to Northrop, hdwd. floors, F.A. heating, elect. built-ins, disposal, dble. gar., pvt. brick patio, fenced yd., landscaped, newly painted int., \$23,000. Hermosa Bch., 379-1542. A

**Television Set**, Zenith 1966, color, 21", full factory guarantee, in factory crate, \$329. L.A., OR 0-5950. A

**Drapes**, 4 panels, orange, 84" wide, \$20. Torrance, TE 5-2128. A

**Miscellaneous tools & parts**, elec. motors, \$5-\$15. Box 2302. A

**Obtain pvt. pilot's license** economically as part owner of late model pvt. aircraft, \$250. Manhattan Bch., 379-2649. A

**Horse**, AQHA filly, 2½-yrs.-old, green broke buckskin, \$550. Torrance, DA 9-2016. A

**House Trailer**, 1961, 1-bdrm., Pan American penthouse model, terms available, \$4000. Gardena, NE 5-9944. A

**Ponies**, red stallion, spirited 3-yrs. old, brown mare, lge., & 1 black & white, 4-yrs.-old, plus saddles, \$150. Cypress, 828-6654. A

**Chevrolet**, 1957, 2-dr. Bel-Aire h/top, chrome wheels, \$400. Lawndale, 371-0680. A

**Wanted to Buy**

**Radio Equipment**, Motorola, GE or RCA FM XMTR & REVR. unit w/up to 100 watts output, unconverted 150 to 170 mc equip. acceptable, mobile & base station needed for 2 meters. Whittier, OX 3-4117. B

**Reverb. Time Delay Unit**, Hammond. Hawthorne, 676-2803. B

**Ski Boots**, man's 9 or 9½ and/or woman's 7½. Hawthorne, 676-7344. B

**Early VW**, appearance not important, good mechanical condition. Woodland Hills, 346-6675. B

**For Sale**

**VW Camper**, 1962, 28,000 miles, Westphalia model, top rack, 2 fitted tents, \$1950 or trade for VW sedan. Gardena, DA 9-2904. C

**FREE (To Be Given Away)**

**Stove & Refrigerator**, older models, Gardena, 323-3245. D

**Rentals Offered**

**Apt**, 2-bdrm., 2-bath, deck, sub. garage, dishwasher, all elec., adults, \$175 mo. Inglewood, 373-1143. E

**Apt**, 1-bdrm., deluxe, built-ins, pool, \$95 mo. Redondo Bch., 376-2117. E

**House**, 3-bdrm., 2-bath, dble. gar., enclosed yd. w/patio barbecue, stove avail., near school, shopping, \$185 mo. Torrance, 371-5694. E

**Duplex**, 2-bdrm., near elem. school, 1-car gar., 1-car parking space, stove & refig., avail. about Feb. 1, \$150. Manhattan Bch., 379-6762. E

**Home**, 3-bdrm., 1½ bath, Hollypark, near Northrop, \$185 mo. Gardena, FA 1-3362. E

**Apt**, 2-bdrm. units, upper & lower, built-in stove & oven, closed gar., soundproofed, near So. Bay shopping center, \$110-\$130. Redondo Bch., 374-5879. E

**Apt**, 1-bdrm., 1-car gar. space, \$110 mo. Manhattan Bch., 367-6137. E

**Room**, unfurn., kitchen & living room privileges, 1-mile from ocean, avail. Feb. 15, \$50 mo. Redondo Bch. 374-2433. E

**Bachelor Apt**, furn., tile bath, lge. closet, utilities paid, 4 short blocks to Northrop, \$16 wk. San Pedro, TE 3-2512. E

**Apt**, 2-bdrm, unfurn., 2 bath, garage, ocean view, utilities paid, \$150 mo. Manhattan Bch., FR 4-0750. E

**Apts**, 1, 2, 3 bdrm., furn. or unfurn., pool, pets, children OK, \$125 mo. & up. Marina del Rey, 392-3173. E

**Rentals Offered**

**Studio Apt**, 3-bdrm., 2-bath, pvt. patio, closed gar., soundproof, hot water & trash paid. \$165 mo. Torrance, FR 5-0867. E

**Apt**, 1-bdrm., laundry room, garage, pvt. patio, \$78.50 mo. Gardena, DA 9-9195. E

**Roommate** to share 2-bdrm. house, furn., built-ins, fully remodeled, \$85 mo. plus utilities. Hermosa Bch., 372-0019. E

**Apt**, 2-bdrm., upper, built-ins & stoves, 2 blks. to Norair, \$110 mo. Hawthorne, OS 6-7417. E

**Apt.**, 2-bdrm., pool, newly decorated, child OK, near fwy & UCLA, \$115 mo. unfurn.; \$125 mo. furn. L.A., VE 7-4036. E

**House**, 3-bdrm., 2 blks. from beach. furn., panelled, fireplace, new refig., gar., patio, references, \$210 mo. Redondo Bch., 378-2109. E

**Apt.**, 1-bdrm., furn., disposal, closed gar., 1½ blocks from Northrop, \$80 mo. Lawndale, OS 6-5425. E

**Rentals Wanted**

**Woman** w/3-yr-old son wishes low-rent accommodations within 10 miles of Northrop. Hawthorne, 676-3575. F

**Personals**

To my friends at Northrop, thank you for your wonderful cards & letters during my illness. Your thoughtfulness & remembrance is most sincerely appreciated. DAVE STADLER. L

**Flying Club** has opening for student pilot. Piper Colt, Torrance Airport. L.A., 293-0213. L

**Flying Club** membership open. Fly Bonanza or Cessna 172 from Hawthorne Airport. 377-4216, 398-3962. L

**Leave Feb. 17**, return Feb. 27 for Mardi Gras in 4-place pvt. aircraft. Share expenses. Rolling Hills Estd., FR 7-3810. L

**Housekeeper**, own transportation, 5 days \$30 wk.; or live in, \$100 mo. Rolling Hills, 377-1094. L

**For Sale or Trade**

**TV**, 23" console, Crosley Eldorado, 1956 model, blond h/wood cabinet w/woven metal doors, new tubes, \$60; or trade for newer portable TV. West Covina, PL 6-2587. M

**Cabin**, 1-bdrm., Big Bear area, \$9995 or trade for property. Torrance, 328-0605. M

**Movie Camera**, Bell & Howell, 16mm, magazine load, \$50 or trade for .22 caliber rifle. Torrance, 327-3160. M

**Renault Dauphine**, 1961, w/sun roof, \$275 or trade for full-size 1958 or later American car. Garden Gr., 714-539-6203. M

**Pontiac Tempest**, 1965, 2-dr. sport coupe, 250 h.p., p/s, radio, \$2390 or trade for smaller car. P.V. Pen., 377-5172. M

**Beechcraft Musketeer II**, 300 hrs. total time, full dual panel w/3 axis Brittain auto pilot, o/size tires, all extras by Beechcraft, \$15,500 or trade for commercial property in Washington, D.C. area. Box 2303. M

**Freezer**, 22 cu. ft. chest-type Coldspot, \$185 or trade for smaller upright. Anaheim, 776-1374. M

Going my way?

**Rides Wanted**

**7:30 a.m. — 4:15 p.m.**

**Alma & 24th Streets**, Manhattan Beach. L. Berg, Norair, ext. 2763, 379-6762. 3

**Appian Way & Park**, Long Beach. Belmont Shore area. W. S. Coleman, Norair, ext. 2015, 433-0861. 3

**8 a.m. — 4:45 p.m.**

**LaBrea & Santa Monica Blvd.**, Los Angeles. Carl Seybold, Norair, ext. 2276, 876-7419. 5

**Coldwater & Sherman Way or Van Owen**, No. Hollywood. Arlene O'Connor, NSL, ext. 518, 982-0492. 5

**Orange Ave. & Del Amo**, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 5

**Shoup & Victory**, Canoga Park. Melvin D. Sadowsky, Norair, ext. 1758, 348-8588. 5

**Rides Offered**

**7 a.m. — 3:45 p.m.**

**So. San Diego Fwy. & Westminster Blvd.**, Huntington Beach. Will take 3 persons - plant 1 only. Ralph Steele, Norair, ext. 1992, 714 847-5029. 12

**7:30 a.m. — 4:15 p.m.**

**Appian Way & Park**, Long Beach. Belmont Shore area. W. S. Coleman, Norair, ext. 2015, 433-0861. 13

**LaBrea & Santa Monica Blvd.**, Los Angeles. Carl Seybold, Norair, ext. 2276, 876-7419. 15

**Coldwater & Sherman Way or Van Owen**, No. Hollywood. Arlene O'Connor, NSL, ext. 518, 982-0492. 15

**Orange Ave. & Del Amo**, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 15

**Shoup & Victory**, Canoga Park. Melvin D. Sadowsky, Norair, ext. 1758, 348-8588. 15

BOWLING

(Continued from page 2)

Wegnes (Norair) won women's "A" doubles laurels with Elva Heald and Maggie Craig (Norair) taking second, Flo Oehler and Mickey Tomblin (Norair) placing third. Women's "B" honors fell to Carol Lemberger and Mary Lemberger of Norair, while Eileen Meyer and Jean Arrasmith of Nortronics took second. Special merit awards went to top performers for the two-day event. Listed below are winners in various events with men's "A" and "B" winners, the women's "A" and "B" winners entered, respectively.

High scratch series, Del Young, Drex Carlson, Flo Oehler and Carol Lemberger; high scratch game, Bud Wegnes, Tom Weaver, Una Lippon and Lucille Kocher.

High handicap series, R. C. Dopf, Conrad Pearson, Elaine Dower and Mary Lemberger; high handicap game, Earl Saunders, Francis Sordelet, Sylvia Pearson and Carmela Moniello.

FRINGE BENEFITS

(Continued from page 4)

due to layoff, retirement, death, or several other factors, he receives the full company 50 percent in Northrop stock. There are some circumstances such as a quit, a termination for cause, or withdrawal of funds which will cause him to lose the last two years of the company contribution. There are provisions for partial or total withdrawal so that the employee can get money out.

Obviously, all of the details of the plan cannot be covered in a short article like this. Copies of the plan have been published and should already be available to everyone. Please read it carefully as it is controlling. Periodic regular saving is just about the best way in the world to assure the future for the individual and his family. When the savings are augmented by the company's 50 percent contribution and the investment services are paid for by the company, the advantages are obvious.

Some other changes are coming up in the savings plan area. Both the new Hourly Savings Plan and the Salaried Savings Plan which had been in effect for sometime provide for changes from one plan to the other in the event the employee's status changes. Furthermore, the Salaried Plan is being amended, effective August 1, 1966, to provide, in substance, that salaried employees who have been continuous participants in the plan for a period of three years may increase their contributions if they so desire to a maximum of eight percent of their salary.

The necessary paperwork will be available to eligible participants prior to that time. The new matters in the savings plan area and other plans that we have been talking about are in process of preparation and submission to the various governmental agencies for approval. No difficulty is anticipated.

For your general information, both savings plans are administered out of the Corporate office by a committee appointed by the company's board of directors. Robert R. Miller, a senior vice president of the company, is chairman of the Savings Plan Administrative committee.



## KWAN YIN: She Sometimes Isn't So Merciful

(Continued from page 1)

there really was a house trailer mounted on a barge."

At each stop along the way the Kwan Yin crew took time out to go ashore, visit points of interest and relieve their steady diet of peanut butter-crackers-bananas.

Skipper Akin elected to steer well away from Santo Domingo and Cuba en route to Haiti, but did encounter an unidentified boat off Cuba with flashing lights they elected to ignore.

In Jamaica the Kwan Yin received a royal welcome at a new Playboy Club as the first yacht to put into its new harbor.

"We were all taking it easy ashore when the public address system came on with a curt: 'Captain Akin your boat is drifting to sea,'" Skipper Akin recalls. "We commandeered the club's fast boat and ran her down—sharp coral had cut through a Dacron line on the anchor chain."

Because his leave was drawing to a close, Bob Peck bid his fellow adventurers farewell and flew home from Jamaica as they shoved off for the Panama Canal.

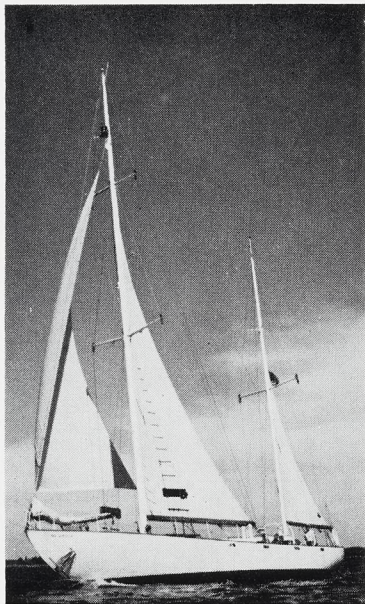
After a few other adventures, the Kwan Yin and crew sailed through the Panama Canal and set a course for Acapulco.

Racing before a good wind at high speed about eight days out the Kwan Yin met real trouble when the steel mast snapped off just above its base. High seas and equally high winds left the crew little choice but to cut away the mast and nine of her 10 shrouds, dropping them overboard. Fouled fuel lines kept the engine from starting and Captain Akin used his radio to send out a distress message.

"An American freighter picked up my message and notified other ships in the area, plus the Coast Guard at Long Beach," Akin said. "Our contact was very bad and we knew little of what was going on. But we knew we had to have help."

The Kwan Yin crew learned later that 10 ships had been informed of their plight and that five in the general vicinity conducted a systematic search under the direction of an Argentine submarine captain aboard one of two subs from that nation. After some anxious moments when the radio transmitter went on the blink, Captain Akin was able to send bearings obtained with his radio directional finder, that led to ultimate rescue.

One submarine took the Kwan Yin under tow and hauled her



The Kwan Yin

into Acapulco, although two tow lines were broken as the unlikely combination faced into high seas and high winds all the way.

Safe in the harbor the submarine commander took stock of the Kwan Yin's condition, dispatching technicians to clear the fuel lines, overhaul the engine, repair a pressurized water system that had worked very little on the entire voyage, refueled and then restocked the fresh water supply.

"They were really wonderful," Mr. Akin said, "I'll never forget them."

Skipper Akin found he was needed back at Nortronics and flew back home from Acapulco, leaving his three-man crew to make their way to Los Angeles with the reconditioned motor and remaining sail.

However, just 100 miles north of Acapulco, Lady Luck stepped in again to delay the trip, this time with a damaged transmission. The Kwan Yin put in at the small port of Zihuatanejo. Two of the remaining crewmen called it quits.

Phil Akin has dispatched necessary parts for repairs and sent down an experienced yachtsman to augment the crew. He hopes to have the Kwan Yin in Los Angeles next month and will repair her damages and perhaps make his home aboard her.

"Aside from all that happened, she is a beautiful ship, dry, well-built and seaworthy," Captain Akin says with pride. "I was never in doubt she would bring us through."

Mr. Akin looks back on the voyage with pride and says bluntly he would do it again, but with a more experienced crew.

"Maybe I underestimated all the factors," Mr. Akin said. "Sometimes it is difficult to see beyond the romantic aspects to the realities. I can now."

## NRC ROUNDUP

# Bridge Activity Pushes to New High; Neophyte Golfer Sweeps Match

Completion of a fall contract bridge tournament for members, plans for competition with outsiders and announcement of a new series of instruction sessions have highlighted activities of the NRC Bridge Club at Nortronics Anaheim recently.

The duplicate contract tournament was held over an eight-week period at NRC Clubhouse, meeting each Thursday. Lee Wearda finished first over-all in the tournament and also teamed with Lyle Alexander for team honors. Mr. Alexander placed second in over-all standings. Third, fourth and fifth places went to Jack Kirkeby, Priscilla and Chet Druliner respectively.

On tap for bridge enthusiasts is a home-and-home match with Autonetics, with the final session to be held at NRC Clubhouse, January 28. This event features 20 players from each firm competing for a perpetual trophy currently held by Autonetics.

During February (Thursday evenings) bridge instruction will be offered at NRC Clubhouse for all levels. Applications for this feature are requested and may be obtained through Personnel Activities or Anne Thomas at ext. 659, Anaheim.

## Basketball League Swings Into Action

Northrop Recreation Club's annual shop basketball leagues swing into action this week. Play is centered at Lawndale high school on Tuesday and at Leuzinger high school on Wednesday and Saturday.

In addition to the regular six-team "A" league, NRC is featuring this year a five-team "B" or "fun" league playing for shorter periods on a smaller court.

Players interested in joining either league may contact Tom White, ext. 2486, Norair.

## Neophyte Golfer Wins Christmas Tourney

What does a fellow do for an encore after winning the first golf tournament he enters just two months after taking up the game?

This is the problem faced by Bob Taylor, a Nortronics Anaheim Facilities engineer.

Mr. Taylor took up golf in October and played only a few rounds before entering NRC's Christmas tournament held December 27-28 at Mountain View



TOPS WITH THE GRAND SLAM—Anne Thomas, secretary of the NRC Bridge Club at Anaheim, presents awards to top four participants in eight-week pre-Christmas tournament. They are (from left) Lee Wearda, Jack Kirkeby, Lyle Alexander and Chet Druliner. Mr. Alexander holds trophy he and Mr. Wearda won as top team competing.

Country Club, Corona, by posting low over-all net to win top honors and a perpetual trophy.

Playing with Jack and Dave Kirkeby and Bert Stanton, Mr. Taylor fired identical 48-56—104 rounds each day. His 30-stroke handicap reduced his net total to 148 for over-all honors and tops in the second flight.

Bill Berger shot a net 153 and Bruce Miller a net 158 for second and third in the second flight.

First flight honors went to Al Collins with a 152, followed by John Rittberg with a 155 and three men, Bob Benedict, Bob Young and John Collins, tied for third with 159s.

## TEAMS

(Continued from page 1)

tion program, the pre-production unit is not considered experimental, Mr. Withee pointed out. The TEAMS concept was proven with an earlier experimental unit called NARATE (Navy Radar Automatic Test Equipment).

A major innovation in fabrication of the pre-production unit was the use of a Nortronics automatic testing unit to checkout subassemblies of the TEAMS unit. Called NATS (Nortronics Automatic Testing System), the unit is similar to the Mark 414, one of the systems used to test Polaris MTRE assemblies.

"The unit is a boon to testing, inspection and rework," Mr. Withee said. "In effect, we now have automatic test equipment testing other automatic test equipment."

## Auto Registration Will Be Conducted In-plant

Nortronics West Coast personnel may take advantage of special arrangements made with the Automobile Club of Southern California to procure 1966 automobile registrations without leaving their respective facilities.

Club representatives will be on hand at various locations on specified days. Personnel may present their registration cards and funds to cover registration.

At Nortronics Hawthorne the representative will be available from 11:30 a.m. to 12:30 p.m. January 21 and 28 at Personnel Activities.

At Nortronics Anaheim the hours are 11 a.m. to 12:30 p.m. January 19 and 26, also at Personnel Activities.

Nortronics Palos Verdes hours will be 11:45 a.m. to 12:30 p.m. January 20, 25 and 27 just inside the north side of building 3.

## CONTRACTS

(Continued from page 1)

administration activities of the Army Materiel Command, the Inspector of Naval Materiel and the Los Angeles Air Force Contract Management District.

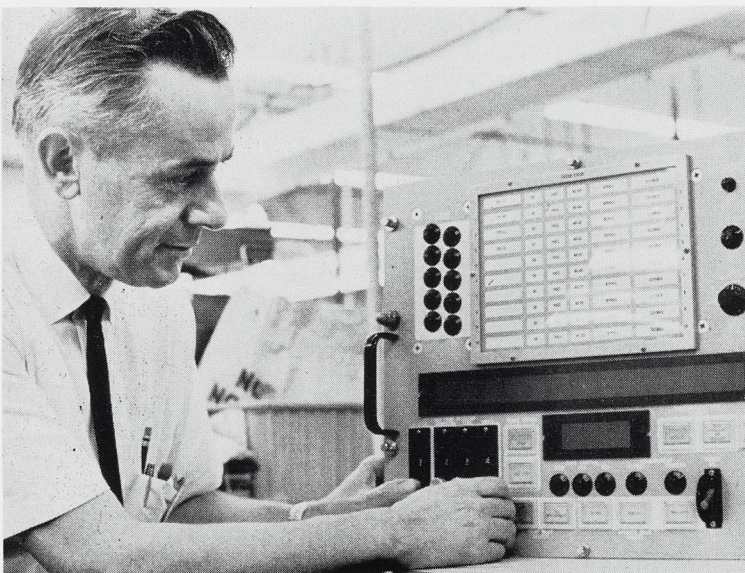
The consolidation aims at improving management and operations through the establishment of uniform policies, procedures and organization. It will provide defense contractors with a single point of contact with the Department of Defense, a lessening of government control over industrial operations, and a uniform application of regulations to defense contractors.

Activities performed by the Nortronics office in their role as contract administrators include pre-award surveys of contractor capabilities; quality assurance; production surveillance; payments to contractor; and similar functions required by the government during the production of defense materials.

## Manager Appointed For Gem Display

A show manager has been selected and dates set for NRC Gem and Mineral Club's biggest event of the year.

The Club's seventh annual display will be held in the Norair Product Display building April 23 and 24 with A. C. Michels serving as show manager.



TEAM EFFORT IN PROGRESS—Northrop Nortronics carried initial TEAMS system from design through fabrication in just under 10 months. Some of those responsible are shown at work, including (from left) Foreman Don Woodward



at logic checking control panel, Yvette Michaud making installations on power supply unit, and Leffel Curry gently placing one of many wires found in logic support component.





# NORTHROP NEWS

NORTHROP NORTRONICS

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February 2, 1966

## Negotiations With Chicago Firm Told

Northrop Corporation is considering acquiring The Hallicrafters Co., of Chicago, it has been announced by Thomas V. Jones, president and chairman of Northrop, and Robert F. Halligan, president of Hallicrafters.

Preliminary discussions between the managements of the two companies have centered around the possibility of Northrop's purchasing all of the Hallicrafters assets and assuming liabilities with payment to be made in cash or Northrop convertible debentures to be issued for the purpose, according to Mr. Jones.

While the terms of the transaction are still to be negotiated, Mr. Jones indicated that the total price would probably be somewhere in the neighborhood of \$20,000,000. He said discussions so far have been along the line of public holders of Hallicrafters stock receiving approximately \$8.00 a share in cash or in Northrop convertible debentures at par, with members of the Halligan family receiving somewhat less than this for their stock.

Hallicrafters currently has about 2,550,000 shares of common stock outstanding, of which slightly more than 50% are owned or controlled by members of the Halligan family. Northrop has approximately 4,168,000 shares of common stock outstanding.

"Our interest in acquiring Hallicrafters is based principally on our belief that Northrop can bring added opportunities for growth of such major Hallicrafters product lines as aerospace electronic counter-measures, shortwave FM radio communication systems, and its 'village' radio, a reliable low-cost modern communications system for new and developing communities around the world," Mr. Jones said.

## OFF THE BEATEN PATH

### Bustamantes' Help Goes Where Needed

In numerous small villages off the beaten path just inside Mexico they are called "Grandma" and "Grandpa," a couple that always seems to have a sweet treat for youngsters.



Mr. Bustamante

To the adults in these communities they are much more. They are friendly visitors always ready to lend a hand in adversity, the givers of clothing, food, advice and encouragement. They ask nothing in return.

"Grandpa" is Milton Bustamante, a Nortronics Hawthorne utility man, and "Grandma" his



Information and Display Systems section engineers, Roy Perschy, Ralph Hare and Tak Noda (from left), surround themselves with projector array, perhaps for inspiration, as they discuss Vigicon system being fabricated for the

U.S. Navy in San Diego for use as anti-submarine warfare simulator. This is one of several Vigicon systems either installed or programmed for space and defense installations.

## Management Club Elects Pat Foster President for 1966

Five officers of the Nortronics Management Club elected January 21 will be installed February 16 at Long Beach Elks Lodge.

The officers-elect are Pat Foster, president, Anaheim; R. E. Gagon, vice president, Palos Verdes; R. J. DeFussi, secretary, Palos Verdes; Kathy Ruddy, treasurer, Anaheim, and K. L. Berry, sergeant-at-arms, Palos Verdes.

The installation dinner and meeting will open with a social hour at 5:30 p.m. at the Elks Lodge, 4101 E. Willow Street, Long Beach. Dinner will be served at 6:30 p.m.

The new president indicated that even before the installation, meetings of the officers will convene to plan activities for 1966.

## Archery Club Sought

Northrop personnel interested in forming an archery activity under possible NRC sponsorship are invited to contact Tony Amundson at exts. 341 or 475, Nortronics Hawthorne.

## The People Of Vigicon: Their Faith Pays Off

Research and development are important parts of an aerospace company's efforts, and one result of such efforts, arising from the Northrop Corporation's independent development program, is Vigicon.

*Report on Vigicon . . . page 3*

This computerized, real-time information display system comes from the Nortronics Research Park Information Displays group, headed by Ross M. Chiles.

The applications engineer in charge of Vigicon is Chuck Blaney, who was brought on board at Palos Verdes in 1962 by Mr. Chiles to present Vigicon to potential users.

With no hardware, no more than the basic ideas and designs for a superior system, the task was to be a difficult one.

"We had faith in Vigicon," Mr. Chiles said, "but we found out very quickly that until we had the hardware no one was really interested. They wanted more than drawings and ideas."

The Vigicon engineering staff, with Norm Singer as supervisor, would have to go beyond the drawing board stage. They had to develop the components they knew they could provide for the system.

Mr. Chiles had worked previously with many of the men who had become the Vigicon staff. These men and others came to Palos Verdes when Vigicon began in 1962.

Joining Mr. Chiles and Mr. Singer at that time were Hank Greenberger, Joe T. LaBorde, Eberhard Weber, Roy Perschy, Tak Noda, Ralph Hare and Al Nunez.

Later arrivals were Vince Gesualdi, Harold Kuhl, Leroy Seefeld and Jim Drevich.

Each of these engineers had, and still has, an important task to perform in getting Vigicon subsystems from the drawings to the form of components.

Working closely with them is Ed Gaudette, manufacturing project representative in Engineering Development Support. Mr. Gaudette is in charge of Vigicon systems production.

John O'Connor, one of the original 1962 group, has taken over field service and system installation.

Project financial controller for Vigicon is John Roehrig. Art Brock and Bob Able provide contract administration guidance and cost estimating.

It wasn't until April 1963, Mr. Chiles reported, "with about 75 percent of our hardware available off the shelf, that we sold our first three Vigicons."

The purchaser was Lockheed Electronics Company, Plainfield, New Jersey.

Since those first three systems were delivered, Vigicon's use in ASW simulation has doubled, with three display systems in use at the ASW School in San Diego, California.

## Vigicon Will Screen Fleet Exercises

Exercises at the Navy's Atlantic Fleet Weapons Range will soon be recorded by a real-time, multicolor information display system now being built by Nortronics.

Northrop will furnish the high density display system for the range control center at Roosevelt Roads, Puerto Rico. The system, which will be operational this year, will aid in the evaluation of weapons systems used by the fleet.

Movement of up to 25 ships, 80 aircraft, and all weapons and troop landing operations can be projected by the three independent display subsystems. Command center personnel will view action during exercises on three 7-by-7 screens.

Nortronics Vigicon subsystems will receive information from both computers and manual sources, and is capable of displaying color-coded data in symbology.

The two side subsystems each consist of five Nortronics Vigicon projectors, and the center projection subsystem contains seven Vigicon projectors.

Side screening groups are served by three plotting projectors, one spotting projector and a reference projector. The Vigicon plotters are used to place data onto the screens as it is presented into the projectors, without requiring a preprocessing technique. Spotters are similar to plotters, but do not leave a permanent record of data fed into that type of device. Reference projectors are used to superimpose background maps onto the viewing screens.

The center subsystem is similar, except it also has the capability to display "time selectable" track history. The two additional plotters in the center device can be preset to alternate the projection of gathered information. While one projector is displaying data, the other plotter continues to receive inputs for future viewing.

## Apollo Test Series Ends Successfully

A vital test phase in the Apollo program to place Americans on the moon was completed January 20 as a flight model spacecraft—with three 83.5-foot Ringsail parachutes—settled to the desert floor near White Sands, New Mexico.

It was the sixth and final test of the spacecraft's launch escape system. It also was the sixth time that the Earth Landing System, developed by Northrop Ventura, has functioned successfully in the White Sands series of tests.

Following the test, NASA and North American Aviation officials declared the launch escape system operational. North American's Space Division of Downey is prime contractor for the Apollo vehicle under contract to NASA's Manned Spacecraft Center.



## FRINGE BENEFITS

## '20-30-40 Plan': New Approach To Life Insurance Program



By WILLIAM LARRABEE  
Vice President—Industrial Relations

As you know, your company has people working throughout the year on a continuous study of our fringe benefits. Their aim is to keep us comparable with our industry. Fortunately, "comparable" does not mean that we are carbon copies of what other people do. Our people are instructed to be imaginative and to think out in front of others as to the real needs of the men and women of Northrop.

As a result, every once in awhile we have what has come to be known as a "Northrop First." This may be something brand new or it may be a different slant on something which exists elsewhere but which serves Northrop people better.

One subject kept coming up again and again during recent brainstorming sessions. Almost all large companies have group life insurance programs where a beneficiary named in the group policy gets a sum of money if the employee dies. Not too many people seem to have given real thought, however, to the family which suddenly loses the wage earner. Nothing is more important to this family than some money coming in regularly for awhile until it gets readjusted, particularly where there are children who must stay in school to get the education they need so badly these days.

In line with this thinking, our people sat down with our insurance advisors to work out something, with two objectives. First, this new plan must provide a monthly amount which would be payable to a surviving husband or wife of a Northrop employee, or if there be none, to the dependent minor children. Second, the amount to be paid must be absolutely plain in order that the survivor or the children would know exactly how much they could count on and for how long.

A program was developed which we might call the "20-30-40 Plan." This program is in addition to the insurance we already have. A general description of how it works was included in the recent announcement of fringe benefit changes which was made on the 19th

of January. As you read there, a policy will go into effect for the individual employee after 90 days of continuous service which will pay his surviving spouse or youngsters \$100 a month for one year.

After the employee completes 10 years of continuous service, the payments mount up and this is where the "20-30-40" begins to take effect. The policy then goes on a schedule which appeared in the announcement and the 10-year person has the protection set out in the schedule for 20 months. The 15-year person has the same protection for 30 months, and the 20-year person has the same protection for 40 months.

There is no problem at all for a family to know exactly what this coverage is. If a 10-year man makes \$100 a week as his base rate, the schedule shows that his eligible family will get \$100 a month for 20 months. If his base rate is \$200 a week the payments will be \$200 a month for 20 months. If the man has 15 years' service, such payments will be made for 30 months. If he has 20 years' service, such payments will be made for 40 months.

This program accomplishes the objective which we started out to achieve. The widow or widower or the youngsters can tell immediately how much they can count on for how long, and they will know that the payments will be made up to the time limit as long as there are eligible people to receive them. We again have a "Northrop First," not that life insurance is new, but we have worked out something clearly adapted to a real need of Northrop families. All of this is done, of course, at company expense.

It will take a little while to get the plan printed up and distributed in its full details, but something will be out in this connection as soon as the insurance company can get it to us.

Hal Janssen of Nortronics is the chairman of our Northrop Industrial Relations subcommittee which does much of the thinking on our fringe benefit programs. He was responsible in large part for working out the new "20-30-40 Plan."



Mr. Janssen

## T-38 Flight Hour Record Claimed By Webb ATC Unit

Webb Air Force Base, Texas, recently claimed a new record for the largest number of flight hours logged by a supersonic T-38 Talon trainer—over 2000.

Shortly before the end of last year T-38 61-0807 touched down at the Texas base with 2000.25 hours on its flight records. Captain Walter L. Kowalik, Flight Test pilot, was at the controls with Colonel Chester J. Butcher, Webb's wing commander, occupying the second seat.

According to Webb sources, "807" was the first Air Training Command "bird" of its type to reach this milestone. Thus the record, subject to confirmation, would be a new one for the T-38s within all United States Air Force inventories.

Major Garland J. McClure, Webb's Quality Control Section head, indicated at the time no other T-38 was within 50 hours of this total, but added T-38 61-0809 ranked as the closest competitor. The latter "bird" is also assigned to the Texas base.

Webb Air Force Base was the first Air Training Command installation to receive the Northrop-built T-38 for supersonic student pilot training and has posted other outstanding marks in hours logged.

## Frank Ross a Winner In Slogan Contest

Frank D. Ross, a Northrop Norair design engineer, was one of more than 30 prize winners in the 1965 United Crusade Slogan Contest.

Mr. Ross's entry earned him a case of tuna, donated by Star-Kist Foods, which he said "will come in handy with five kids around the house."



## TV Appearance Set For Joanie Cahn

Joanie Cahn, pianist and nine-year-old daughter of Mr. and Mrs. Mickey Cahn, will be featured Sunday on Ted Mack's Amateur Hour on CBS Television, Channel 2.

The program was taped earlier this month in Los Angeles, according to Mr. Cahn, who is an engineer at Northrop Norair.

A fourth grader at Edison Elementary School in Torrance, Joanie won first place at the 1965 Southwest Youth Music Festival.

## Janet Carroll Wins Junior Miss Title

Laurence B. Carroll jr. is prouder than ever of his 17-year-old daughter Janet, if that's possible.

Janet has won the title of 1966 Ventura County Junior Miss in competition with 12 other high-caliber county-wide finalists from six high schools.

Northrop Ventura's director of Production and Production Engineering approves wholeheartedly of the Junior Miss Pageant, particularly since competition is based on all-around capabilities, not just beauty.

For example, in the four-phase contest, Janet was honored as tops in scholastic capability.

She also captured the hearts of fellow contestants, who voted her Miss Congeniality.

## PIONEERS IN PARADYNAMICS: PART 4

## A Chute With a Hole in It and a Harness for Astronauts

To the average spectator, watching a parachute float to the ground supporting a man or load of equipment, one such device is much like another.

Not so to Carey Buhler of Northrop Ventura, who for some 25 years has done almost everything with parachutes except use them for bedsheets.

For example, three of the United States space programs, Mercury, Gemini and Apollo, have listed him as project engineer on the parachute landing systems, the first two with primary responsibility in that area.

Mr. Buhler, now Apollo parachute system project engineer for Systems Engineering and Analysis, started his engineering career at Wright Air Development Center, Ohio, in 1940. For a year and a half he wrote specifications on aeronautical emergency equipment, including parachutes.

Paradynamics was the most interesting subject of the specifications he wrote, Mr. Buhler felt, so that was the direction he took next in his career.

For another 6½ years at Wright he was involved with paradynamics, often utilizing specifications he himself had developed in his previous work.

It was during this period, in 1947, that Mr. Buhler filed his patent on an annular parachute, which, surprising to some people, produces more drag because of a large central opening.

This same chute is the predecessor of

one now being investigated by Ed Ewing at Northrop Ventura for aerial pickup of satellites.

Mr. Ewing, another pioneer paradynamist at Ventura, has combined Mr. Buhler's patented large annular opening with alternating rings of nylon fabric and open slots in a canopy type currently being evaluated.

"These 'airfoil chutes,'" Mr. Buhler indicated, "are much more stable than other designs at altitudes of 35,000 or 40,000

feet and higher, the region where parachutes must be inflated for satellite pickup.

"The over-all canopy diameter for the same amount of drag as produced by other designs is larger, but the area of actual material is less, reducing weight and bulk."

While serving as technical director of the Naval Parachute Facility, El Centro, Mr. Buhler directed development of a parachute system for escape from vehicles at supersonic speeds, and a system for VTOL aircraft that would protect pilots

even during takeoff and landing.

At El Centro, he worked on the granddaddy of the personal harness now used by the astronauts.

"Until 1954," Mr. Buhler said, "anyone putting on a parachute harness could expect to be gouged in half a dozen places. There were buckles you sat on and leaned against, and it was hard to be comfortable during a flight of any duration.

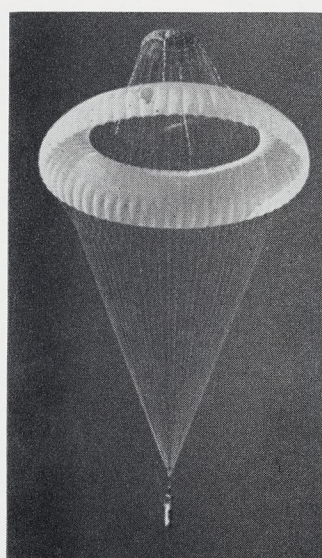
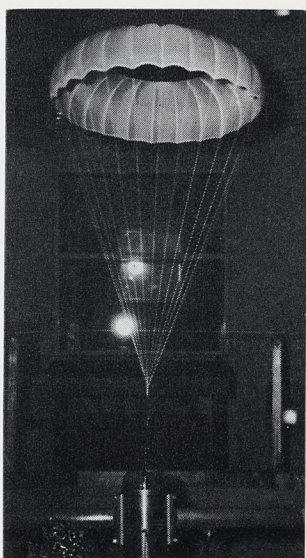
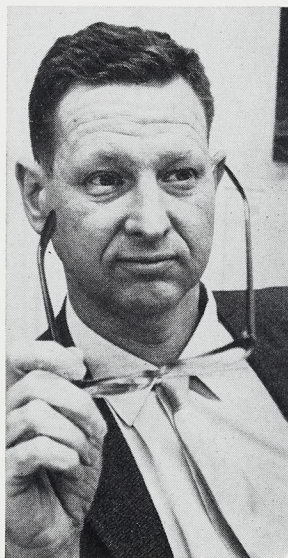
"The harness we developed at El Centro had only one adjuster, on the chest of the wearer. Today's integrated suit harness, used in exposure suits, full pressure suits, or G suits, is a direct descendant of that one."

For a man connected with paradynamics, Mr. Buhler hasn't jumped very often, just twice. Both times he ended up in the water. The first jump was at Indian Lake, Ohio, and the second a free fall jump near El Centro, into the Salton Sea.

"I didn't get enough of a thrill out of it," he said, "to take it up as a regular thing. But I am glad to have experienced it those two times."

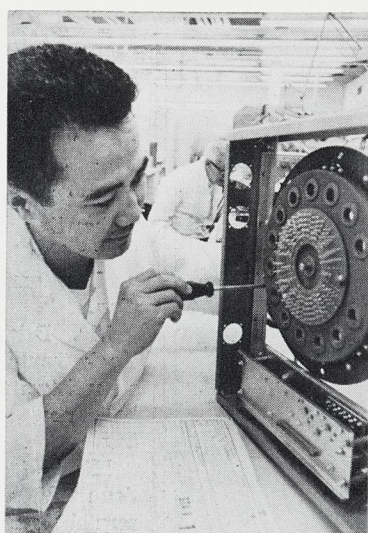
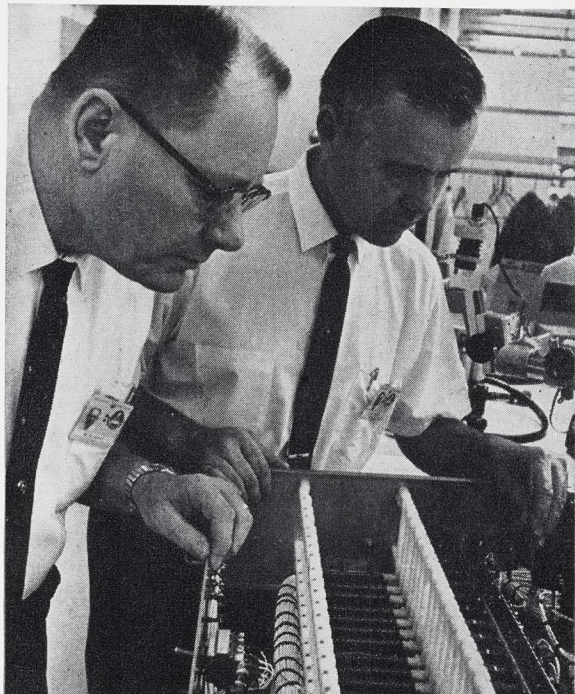
Mr. Buhler's first responsibility at Northrop Ventura, in 1956, was a recovery system for an air-to-ground missile, the Green Quail GAM-72.

He was project engineer during the entire Mercury recovery system effort from 1959 to 1962 and on Gemini from the program's inception through the first year and a half.



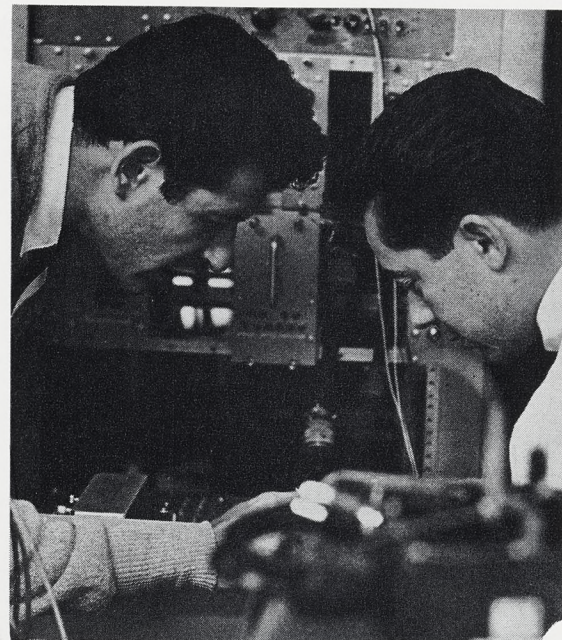
Carey Buhler (left) holds patent on annular parachute (center) shown here in 1947 test at Wright Air Development Center. Ed Ewing of Northrop Ventura has combined annular chute with innovations of his own to produce "airfoil" concept (right).



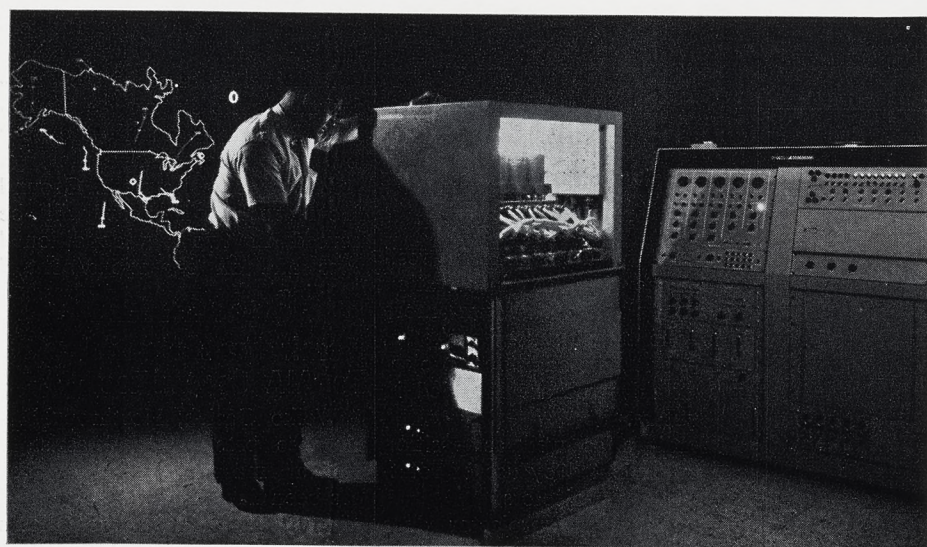


Norm Singer (left), AUTEK system project engineer, and Vince Gesualdi hold engineering consultation.

Symbol drum wiring is assembly task for Mrs. Jean Pierce (photo below) while H. M. Tokashiki works on symbol generator assembly (at left). In photo at right, W. R. Duffy and A. R. Carter carry out inspection on symbol select matrix. Fabrication of Vigicon units is centered in Engineering Development Support group at Palos Verdes.



Complete Vigicon display system (at left) receives attention of Chuck Blaney, applications engineer at Research Park, Palos Verdes. This system is used in demonstrations for potential users. M. H. Holeton (at right) runs test on slide changer.



## Vigicon Delivers the Big Picture—in Real Time

Little more than three years ago Vigicon was no more than a name and a concept in what is now the Information Displays group at Nortronics, Palos Verdes.

Today, Nortronics' Vigicon display systems are protecting lives and supporting multimillion dollar programs by providing complex systems of real-time information.

Such information includes observed objects in their real-time positions, vector or continuous line imagery showing paths of these observed objects, and background maps or diagrams.

Since Gemini 4, Vigicon has played its data presentation role during manned space shots, including the recent Gemini 6 and 7 rendezvous mission. With Apollo, the work will continue.

The Navy's Anti-Submarine Warfare training program uses six display systems at Norfolk, Virginia, and San Diego, California.

Navy helicopter crew instructors keep track of the aircraft and their targets in simulated flight with trailerized Vigicons at four locations in this country and Japan.

A dramatic new application for Vigicon is at the Navy's first underwater test range (Atlantic Underwater Test Evaluation Center), Andros Island, Bahamas. There the system provides real-time display of vehicles in the air, on the sea, and underwater during missile and weapon testing.

At Mare Island Naval Station, California, a Vigicon performs as a conning tower simulator in submarine training work. Three systems utilized by the Atlantic

Fleet Weapons Range at Roosevelt Roads, Puerto Rico, evaluate the tactical deployment of weapons systems, recording and displaying ship positions, aircraft movements, weapon firings, troop landings and other activities.

The United States space program utilizes four Vigicon display systems in all.

One is at Cape Kennedy for the Air Force Eastern Test Range where missile, satellite and space vehicle trajectories and orbits are traced in the range control center.

An additional Vigicon installed for Apollo and Gemini mission analysis is located at NASA's Goddard Space Flight Center in Maryland.

At the Manned Space Flight Center in Houston, Texas, a Vigicon analyses, selects and displays

optimum recovery systems for spacecraft during terminal landing operations.

X-15 flights from the NASA Flight Research Center at Edwards Air Force Base, California, are monitored by Vigicon.

What exactly is Vigicon?

The Greek syllables that give the display system its name mean alert image. The system can utilize inputs from a multitude of sources to project real-time information onto a screen ranging from 15 inches to 20 feet square.

Typical inputs include telemetry signals, communications transmissions, photographic material and computerized inputs. Information can be generated and presented on a screen within milliseconds of acquisition without any pre-processing procedure.

Final inputs to the presentation equipment must be in the form of dc analog voltages, so, in digital input applications data buffers or converters are used.

Each Vigicon system is customer designed from off-the-shelf hardware according to the user's needs. Because Vigicon relies on modules to form the total system, a great variety of configurations may be prepared.

The backbone of the system is a series of compact projectors four inches wide, which are arranged in arrays for projection of data images. Optical accuracy is in the area of .0005 inches.

Three basic types of projectors, for reference information, spotting of moving targets, and plotting of continuous line imagery and symbology, are available.

The projectors rely on the same series of components to provide the required capabilities. They receive and simultaneously project the real-time information to be displayed.

The basic components include a light generator, slide change mechanism, an X-Y axes servomechanism, projection optics and a six-color turret.

Information may be projected in contrasting colors. Color, although not always essential in a display system, is a characteristic readily accepted by man for purposes of target classification.

The light source is an incandescent lamp in an air-cooled housing with a heat glass for protection of slides.

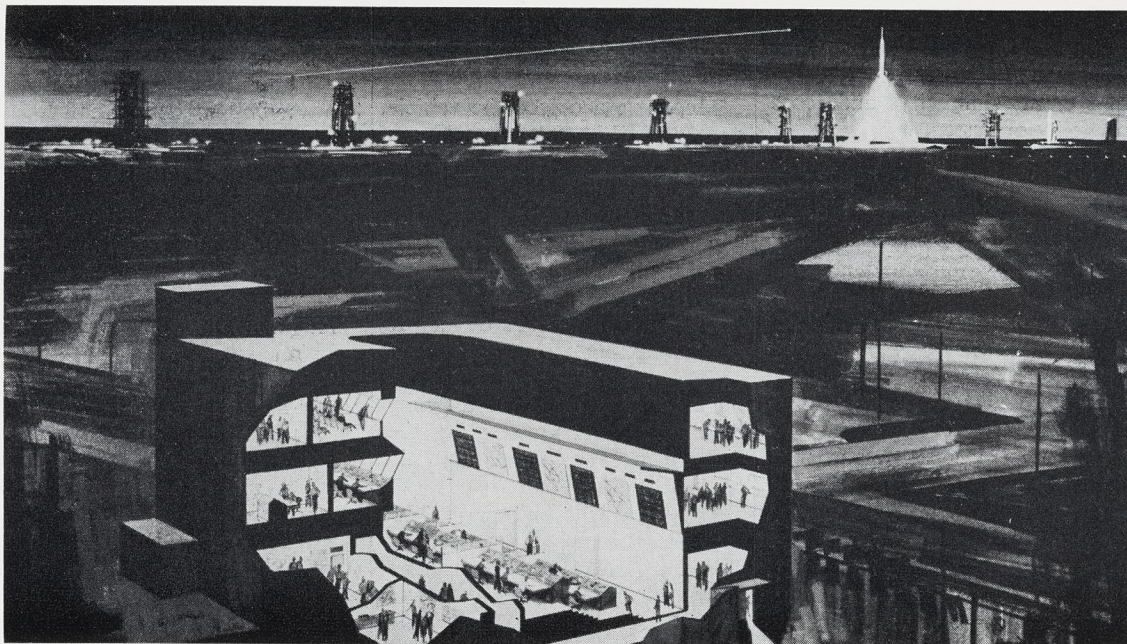
Redundancy is provided by dual lamps. When one burns out, the lamp carrier automatically rotates for continuous service. The burned-out bulb may be changed while the projector remains in operation.

The plotting projector includes the light generator, slide change mechanism, X-Y axes servomechanism, projection lens, and optionally, the color control.

Forty slides are retained in each magazine. In the plotting projector configuration the slides are blank and opaque. A stylus mounted on a plate is automatically placed in contact with the slide in use to scribe the necessary vector lines or symbols through the opaque coating. Slides may be changed automatically by the system or manually by the operator.

The spotting projector contains a metal plate or slide controlled by the X-Y servomechanism and bearing any desired symbol —

(See VIGICON, page 4)



Artist's concept shows control center at Air Force Eastern Test Range, where one Vigicon system is already installed.

Black areas between screens are electronic status boards. Control room is at Kennedy Space Center in Florida.



## Government Agencies Taking Close Look At 'Highly Imaginative' HL-10 Project

The impact of Northrop's "highly imaginative and economical approach" to the development and construction of the M-2 and HL-10 lifting body research vehicles may have a significant effect on the management of such projects and the way of doing business with the government, according to Paul F. Bikle, director of NASA's Flight Research Center.

"Northrop Norair has used a highly imaginative and economical approach to the construction of the M-2 and HL-10. They have selected a small group of extremely well qualified hand-picked engineers and technicians to perform the work.

"They have taken readily available components — items that have already proven themselves in actual flight — and used them whenever possible in the lifting body.

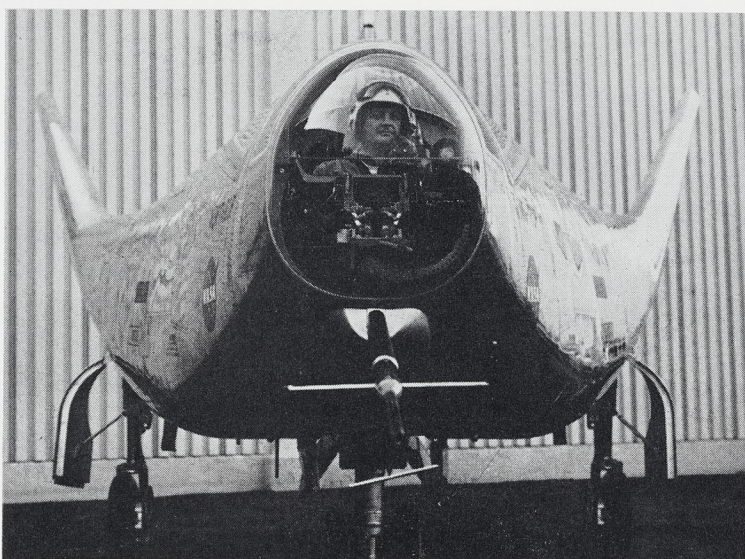
"Decisions for modifications and changes, that normally require reams of paperwork, were discussed through almost daily meetings of the principals responsible.

"All of the personnel involved enjoyed an extremely close working relationship."

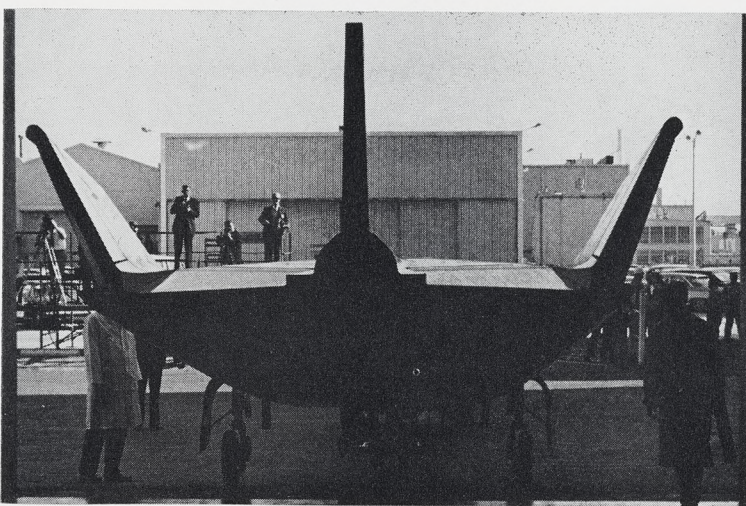
Mr. Bikle, who was NASA representative at HL-10 delivery ceremonies January 18, said the noteworthy approach has not gone unnoticed, "either by NASA or other people for that matter."

"These other interested parties have shown both formal and informal interest and all have been most impressed and full of praise."

The transformation from wind tunnel and theoretical design to actual flight vehicle is more than just building and construction



SHAPE OF THE FUTURE?—Contrasting views of front, above, and rear of Northrop's HL-10 lifting body research vehicle are captured in these pictures. Milton Thompson, chief test pilot for NASA lifting body program, sits in cockpit where he has wide angle view for landing. Tri-fins of HL-10 are highlighted below during rollout ceremonies in photo by Dave Saldana.



work, Mr. Bikle pointed out.

"Norair has often been required to solve more basic design problems. They have added greatly to the advancement of lifting

body technology."

Addressing members of the program staff, government representatives and Northrop management, Mr. Bikle continued:

"Under the terms of an intentionally loosely-written contract, where it would have been possible for you to use shorter and cheaper methods, your engineers and technicians have steadily refused to sacrifice quality. It is easy to see that there was a great deal of pride in the workmanship that went into the construction of the HL-10.

"Even the most casual observer must recognize that both the M-2 and HL-10 are highly unusual flying machines. Norair deserves the greatest credit for the manner in which they have overcome the problems in building these unconventional aircraft.

"In the long run . . . the really significant contribution of this effort may well prove to be the impact it may have on the management of projects of this nature, and the way of doing business with the government."

Mr. Bikle accepted the vehicle, on behalf of NASA, from Northrop President and Chairman Thomas V. Jones.

Also on the program at Hawthorne was Brigadier General B. G. Holzman (ret.), who read the prepared remarks of Dr. Alfred J. Eggers, jr., NASA's deputy associate administrator for Advanced Research and Technology. Dr. Eggers was the scheduled principal speaker, but pressing business matters in Washington kept him from attending.

Dr. Eggers praised the "highly competent manner" in which the M-2 and HL-10 were constructed. As did Mr. Bikle, Dr. Eggers lauded the efforts of the Langley Research Center which designed the HL-10 and the Ames Research Center which designed the M-2.

### PERFECT GAME NETS BONANZA FOR BOWLER

Nortronics Hawthorne's Robert E. Briggs really reaped a bowling bonanza late last year when he rolled his second perfect game in sanctioned play.

Mr. Briggs won \$300, a clock trophy, a diamond ring, a wristwatch, new bowling ball, new shoes and a new bag.

His feat came in the Gardena Valley Classic (925 scratch) and ended what had been a "rough" night for him (he had rolled 189 and 171 games with a 198 average).

Ten years ago Mr. Briggs rolled his first perfect game, ending the night with an impressive 808 scratch series. His other games were 256 and 252.

### VIGICON

(Continued from page 3)

cross hairs, aircraft, missile or other target.

The image of this symbol is projected on the screen in position according to information provided Vigicon. When more than one target must be shown, at any one time additional projectors of this type are included in the system.

Headings as well as position can be indicated by use of rotating spotting projectors.

The reference projector does not include a plotting mechanism. Its magazine stores up to 40 prepared slides with reference material such as maps, profiles, compass roses or diagrams.

All information is shown on a single screen unless multiple screens are required by the user.

## 'AIR CONDITIONED' SPACE SUITS POSSIBLE WITH NSL CONCEPT

Keeping cool during hot summer weather on earth is relatively simple during these days of air conditioning, but keeping space-going astronauts comfortable in their insulated space suits is something else again.

Northrop Space Laboratories has come up with some ideas in space suit cooling and dehumidification in zero or lunar gravity that could eventually produce less complex, less expensive and more dependable suits.

The first astronauts relied on blasts of air throughout their suits to keep them cool and remove moisture. Since then, liquid circulated through tubes in the suits has been added to cool them. The airflow remained but could be reduced since it was only removing moisture, not sensible heat.

NSL was one of the pioneer investigators of the liquid-cooled suit concept. Although not currently in use for Gemini, the concept will be applied on Apollo missions.

At Space Laboratories, the question arose: Why not eliminate the complexity of a circulated air loop completely by finding another way of dehumidifying? A gas system would be retained to provide suit pressurization and breathing.

For some time, Bill Woo, Constantino Cafaro and Bill Bentilla have been investigating substitutes for the air loop dehumidification.

Working in the Thermodynamics group under the direction of

## Page Wins Contract in Australia

The Overseas Telecommunications Commission of Australia has awarded Page Communications Engineers a contract to install a satellite communications earth station at Carnarvon, Australia.

The western Australian station, scheduled to be completed and operational by October 1966, will be used initially as part of a worldwide communications system to provide tracking and data acquisition for the NASA Apollo Manned Lunar Landing program. Further utilization is planned in the development of commercial satellite communications to provide relief for Pacific and Southeast Asia coaxial cable systems soon to be working at full capacity.

Principal features of the Page-designed earth station are the 42-foot Casshorn antenna, the very low noise receiver, and the high precision control system. Ground mounted equipment will be housed in two air conditioned vans and an operations/control building.

### Norair Exec Named To AIA Committee

Welko Gasich, Northrop Norair vice president and assistant general manager-Technical, has been named vice chairman of Aircraft Industries Association's Vertical Lift Aircraft Council.

The Council includes representatives from 15 member companies. It coordinates and presents vertical lift industry's views on common problems and acts to advance and promote the worldwide utilization of VTOL.

Arnold Shlosinger, the investigators have developed some promising answers.

Their investigation includes wicks wound around the coolant tubes. The coolant provides a temperature low enough to condense moisture within the wicks. The moisture could be stored in wicks or transported outside the suits through the wicks.

So far, two materials have proved best for wicking, glass fibers and Refrasil, and further experimentation will be necessary to determine the specifics of a dehumidification system design.

Further investigations resulted in a study of a completely passive space suit concept where a heat sink material and desiccant were proposed to handle the temperature control and dehumidification.

For short durations, suit cooling could be performed by such heat sink materials as paraffin, which melt as they absorb heat, to solidify and release the heat energy when removed from the source.

Silica gel or molecular sieves could be used as desiccants to handle the dehumidification. Use of the concepts investigated, although time limited, would provide special purpose suits applicable for moving between shelters on the moon or for leaving a space vehicle to carry out brief tasks.

Their comparative simplicity would offer considerable increase in reliability and cost reduction.

## LIFTING BODY SUCCESS CREDITED TO 'JOINT ACTION MANAGEMENT'

The production of M-2 and HL-10 lifting body vehicles "at a fraction of the cost and in a fraction of the time regarded as acceptable for comparable projects" was credited by Northrop President and Chairman Thomas V. Jones to a Joint Action Management Plan initiated by Northrop and NASA for the development program.

Speaking at rollout ceremonies of the HL-10 last month at Norair, Mr. Jones outlined the 10 principles used in establishment and operation of the management plan:

1. The vehicle was designed and constructed for operation in a specific environment and to meet only those specifications that are necessary for operation in that environment.

2. Proven off-the-shelf hardware and existing know-how were used thus avoiding reliance on technological breakthroughs.

3. An autonomous project area was established and key people were given full authority and power to make on-the-spot decisions, thus shortening the chain of approval required to take action.

4. The project was staffed with an elite team of specialists with maturity and experience the most important qualifications. Average experience of design and shop specialists on the HL-10 project was 20 years.

5. Each member of the team was fully indoctrinated in the goals of the program. Each individual was given personal responsibility for his portion of the end product, with decisions made by responsible individuals, not committees.

6. Paperwork was kept to a

minimum. In the small, self-contained unit, communications for these purposes were direct and personal.

7. The project was located in an integrated area where engineering, tooling, manufacturing, planning, material coordination, and assembly were in the same room or in an immediately adjacent area.

8. Basic design approach was based upon: (1) realistic appraisal of the requirements; (2) conservative structural design; and (3) maximum simplicity and commonality of systems.

9. Detailed parts fabrication was accomplished in the advanced production shop where equipment and personnel are adaptable to one-of-a-kind fabrication.

10. The entire vehicle was assembled on a tooling dock.

"None of these principles could have been applied without the fullest cooperation by NASA," Mr. Jones said. "In fact, this may well be the most important single element in the plan.

"NASA's people were willing to forego all of the prerogatives of government and instead to place their confidence in the autonomous management of this project, to look at it not as a Northrop-managed project but as a jointly managed project."



# Classified

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accented. The Northrop News reserves the right to edit or omit ads. Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

## For Sale

**Carpeting**, 73 yds., all wool, deep pile, gold broadloom, 5 months since new, orig. cost \$1095, now \$365. L.A., 472-2571. A

**Volkswagen Camper**, 1961, radio, 5 new Premium tires & tubes, ext. awning & side enclosures, built-in ice box & fresh water supply, \$1175. Torrance, 371-5229. A

**Baby Crib**, \$25. Torrance, 325-2744. A

**Lot in Calif. City**, near new school, \$3500. Gardena, 327-2666. A

**Eico**, 723, 60 watt, 80-10 meter, transmitter w/relays & crystals, \$30. San Pedro, TE 3-9696. A

**House Trailer**, 1956, Kenskill, 23½', equipped for on the road living, gas refrig. & gas lights, 12 V. to 110 V. inverter, dble. bed, stall shower, \$1695. P. V., 377-1075. A

**Studebaker Lark**, 1961, 4-dr. sedan, 43,000 mi., \$680. Hermosa Beach, FR 9-7342. A

**Austin Healey Sprite**, 1959, \$550. Torrance, 328-0605. A

**Ford**, 1947, 4-dr., \$375. Playa del Rey, 391-8072. A

**Rambler Station Wagon**, 1961, automatic, \$375. Lawndale, 679-8426. A

**AM-FM Tuner**, multiplexer, 30-watt stereo amplifier & 2 12" coaxial speakers, \$70. Torrance, FR 8-1350. A

**Bicycle**, convt. boy or girl model, 20", \$15. Costa Mesa, 714-546-5341. A

**Tennis Raquet**, ladies' & frame, \$5. Hawthorne, 676-3575. A

**Organ**, Baldwin Model 40 Orga-Sonic w/percussion, Philippine mahogany, matching bench, 2 keyboards, 1 octave of bass pedals, \$675. Redondo Beach, FR 5-3914. A

**Outboard**, Century plus, 5 HP, used about 3 hours, \$185. Marina del Rey, 392-3173. A

**Rifle**, .22 Marlin, lever action, \$50. Redondo Beach, 370-7213. A

**TV**, 24" RCA, contemporary birch console, new picture tube, compl. set of spare tubes, \$75. Lomita, DA 6-6214. A

**Washer**, RCA Whirlpool, auto. w/matching gas dryer, pink, \$100. Redondo Beach, 375-3266. A

**Lot**, single, Inglewood Park Cemetery, Parkview, \$550. Torrance, TE 5-2128. A

**Ski Boat**, Corsair SK-15, 15', 90 HP Evinrude, tach., speedometer, many extras, \$1600. Simi, 805-526-1677. A

**Corvette**, 1962, h/top, new Goodyear tires, 300 HP, 4-spd., \$2350. Compton, NE 2-7635. A

**Cadillac**, 1962, 2-dr., low mileage, \$2250. El Segundo, EA 2-0677. A

**Range**, elec., Westinghouse, copper tone, 4-burner, auto. oven & timer, \$175. Gardena, 324-0274. A

**Ford**, 1953, rebuilt engine, \$250. Hawthorne, 676-6737. A

**Rifle**, .308 caliber, bolt action, w/sling & recoil pad, \$50. Hawthorne, OS 6-4915. A

**Cruiser**, 1962 Chris-Craft, 32', sleeps 7, twin Chrysler marine engs., full canvas covered, new C/G approved life jackets, new paint, many extras, \$6500. Gardena, 323-5951. A

**Condominium Studio Home**, 3 bdrms., 2½-bath, all elec., built-ins, fireplace, closed gar. & carport, pool, putting green & clubhouse, 10 min. from Northrop, \$31,000. Torrance, DA 7-2831. A

**Topsoil**, 2 yards, lge. dump truck load, you pick up, \$15. L.A., 645-8373. A

**Mercury Park Lane sta. wagon**, 1960, p/b, p/s, p/w & p/seats, air conditioning, new brakes & new tires, \$800. Hawthorne, 644-3162. A

**Stenotype**, \$25. Redondo Bch., FR 2-1402. A

**Sloop**, 24' Herrshoff, 1961, rugged ocean cruiser/racer, fully founded, top craftsman-ship, \$5500. Gardena, 324-8664. A

**Bicycle**, Campi, 10-spd., \$80. L.A., 476-1649. A

**Chevrolet Station Wagon**, 1957, 4-dr., new paint, r/h, good tires, Powerglide, rebuilt motor, new shocks, \$450. Torrance, 324-5698. A

**Freezer**, Sears, 14 cu. ft., chest-type, \$20. Harbor City, 326-1409. A

**Television**, 17" Packard Bell, antenna & spare tubes, \$50. Torrance, DA 3-8797. A

**Table Saw**, 10", ½ HP motor, 2 exts., bench, dado & mortising set, \$95. Gardena, DA 3-3202. A

**Luggage Carrier** for station wagon, extra long, zipper encl., 6' x 4' x 1', rainproof canvas, \$25. Lawndale, OS 9-0876. A

**Honda**, 50 cc, 1965, w/elec. starter, windshield & mirrors, only 50 miles, \$225. Inglewood, 754-3946. A

**Truck**, 1965 Ford Ranchero, r/h, 6-cyl. stick shift, new car guarantee, \$200 & take over \$59.89 mo. pymnts., \$1650. Newbury Pk., 805-889-0588. A

**Bicycle**, girl's, 24", J. C. Higgins, \$15. Hawthorne, OS 5-2882. A

**T-Bird**, 1956, h/top, recent o/haul, paint & tires, auto., orig. owner, \$1275. Pacific Palisades, 454-2057. A

## For Sale

**Folding Bed**, ¾ size w/innerspring mattress, \$25. Torrance, DA 5-5245. A

**Honda 90**, 1965, low mileage, \$350. Ross-moor, GE 1-7765. A

**Dog House**, \$5. Hawthorne, 675-9389. A

**Stove**, O'Keefe & Merritt, full size oven & broiler, 34" wide, \$45. Gardena, 327-2279. A

**Air Conditioner**, Universal, for auto, used 2 times, cost \$45, \$25. L.A., 472-3374. A

**Chevrolet**, 1949, Carryall, 8-pass., new headliner & paint job, \$200. Hawthorne, OS 5-1354. A

**Sewing Machine**, Kenmore blonde console, buttonhole attachment, \$40. Torrance, 327-3344. A

**Nash Ambassador sedan**, 1951, good eng., \$100. Anaheim, KE 5-6296. A

**House**, 3-bdrm., den, 1¾ baths, built-in stove, dishwasher, lge. backyard, sprinklers, 3-yrs-old, GI loan, \$27,500. Los Alamitos, 430-7721. A

**El Camino**, 1959, 4 spd., 348 cu. in., Tri Power, \$750. Hawthorne, OS 9-2771. A

**TV**, 19" Zenith, portable, & stand, 2-yrs-old, \$100. L.A., 754-9889. A

**Lock Sets**, 2 Schlage doorknob, brass, keyed alike, \$10. Inglewood, OR 4-1654. A

**House**, 3-bdrm., 2-bath, family rm., custom kitchen w/built-ins, \$32,500. Manhattan Bch., FR 6-7681. A

**Plymouth**, 1958 4-dr., good mech. cond., \$400. Wilmington, DA 6-2729. A

**Baby Swing**, convt. seat for car use, also plastic baby carrier, \$8. Gardena, 329-9484. A

**Range**, elec., Kenmore, 4 burners, 2 ovens, 2 storage drws., \$75. Manhattan Bch., 372-4907. A

**Washer**, G.E. automatic, 12 lbs. cap. \$50. Hollydale, ME 3-2395. A

**House**, 4-bdrm., family room, 2½ baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

**Ford Pickup**, 1965 ½-ton, custom, V-8, Cruise-O-Matic, plus many extras, air conditioning, \$2450. Gardena, 329-9249. A

**Volkswagen**, deluxe station wagon, 1961, new paint, eng. recently o/hailed, \$1100. Anaheim, TA 8-2440. A

**Chevrolet**, 1957 4-dr., auto., w/w, r/h, low mileage, \$325. Compton, 632-3623. A

**Surfboard**, 9' Jacob, 2 redwood stringer pigment, reinforced skag, 1-yr-old, \$70. Torrance, 370-2048. A

**Ford**, 1959 4-dr., r/h, auto., low mileage, \$300. Manhattan Bch., FR 2-0623. A

**Baby Furnishings**, youth bed & mattress, playpen, car seat, stroller, \$30. Torrance, 371-7298. A

**Surfboard**, 9'6", \$55. Torrance, DA 9-9670. A

**Land**, L.A. County, Antelope Valley Hi Vista area, 2½A, 5A, 10A, terms, \$450. Los Alamitos, 431-7056. A

**Ford Roadster**, 1932, \$300. Lawndale, OS 5-1219. A

**T-Bird**, 1953, new factory eng., \$1700. Rolling Hills, 377-2200. A

**Ford**, 1957, 6-cyl., auto. trans., \$125. Manhattan Bch., FR 6-9964. A

**Baby Furnishings**, baby crib, stroller, playpen, \$25 or sell sep. Hawthorne, 675-6020. A

**Sand Sailer**, 10' long, 6' wide, front steering, \$150. P.V. Pen., 377-5862. A

**Condominium Apt.**, 3-bdrm, 2-bath, improvements, \$18,500. Wilmington, 834-8995. A

**Piano**, blonde spinet, Kohler & Chase, upholstered bench, \$450. L.A., 645-7931. A

**Jacket**, black broadtail, w/black double mink collar & cuffs, size 10, \$225. L.A., 762-9397. A

**Buick Le Sabre**, 1961, auto. trans., p/s, p/b, r/h, o/size w/s/w tires, trailer hitch, \$995. Torrance, 371-6240. A

**Radial Saw**, Delta Rockwell 10", complete w/stand, 2 blades, 1½ hp dual voltage motor, prof. contractor's model, cost \$395, \$225. P.V. Pen., 377-6434. A

**Cabin Cruiser**, 19½' Glasspar, clubmariner, Volvo inbd-outbd., trailer, \$3795. Manhattan Bch., 374-7290, 374-3164. A

**Hollywood Bed**, mattress, box springs, metal frame w/casters, \$20. Box 201. A

**Surfboard**, Dewey Weber, 96.00 long, 22½ wide, stock fin, med. rails, 2" balsa stringer, orig. owner, \$70. Hawthorne, OS 6-3792. A

**Sewing Machine**, portable, Montgomery Ward, used very little, \$25. Long Bch., GA 3-1363. A

**Chevrolet**, 1958, 4-dr. sedan, 348 eng., p/s, r/h, new Powerglide trans., brakes, starter & tires, \$450. L.A., AX 4-0727. A

**Chevrolet**, 1958, p/s, auto. trans., V-8 eng., push-button radio, heater, \$495. Hawthorne, 676-4837, 676-9989. A

**Trailer**, 40', 1953, ABC, 2-bdrm., bath & shower, \$2000. Hermosa Bch., FR 2-6556, 393-4389. A

**Metropolitan Museum Seminars in Art**, 24 vols., complete w/288 color prints, orig. cost \$100, \$25. P.V. Pen., FR 8-1863. A

**Sunbeam Roadster**, 1963, r/h, wire wheels, new tires & paint, \$1200. L.A., MI 5-4163. A

**Corvette**, 1963 Sting Ray, fastback, 4-spd. stick shift, Spec. handling package, hvy. duty shocks, many extras, Vibrasonic AM radio, rear speakers, \$2800. Lawndale, OS 6-6818, OS 6-5425. A

**Home**, ocean view, 2400 sq. ft., 4-bdrm., family rm. & living room, lge. patio, near schools, \$49,500. P. V. Ests., FR 5-4049. A

**Power Lawnmower**, reel-type, Sears push & start, 18", 6 blades, cost \$125, \$60. Venice, EX 1-2040. A

**Fiat**, 1953 Topolino, convt. coupe, 4-cyl., o/head valve, collector's car, \$500. Riverside, 689-7678. A

## For Sale

**R-3 Lot**, in Palm Desert, 155x115, ½ down, \$18,500. L.A., 472-2722. A

**Volkswagen**, sedan, 1965, white walls, orig. owner, \$1575. Inglewood, 673-1589. A

## Wanted to Buy

**Complete set of works of Jules Verne**. Hawthorne, OS 6-5253. B

**Piano**, spinet-type, reasonable. Fullerton, 528-6914. B

**Sewing Machine**, complete w/max. gadgetry, prefer Singer, reasonable. Hawthorne, 679-2488. B

**Radio Equipment**, Motorola, GE or RCA units for use on 2 meters, unconvtd. 150 to 170 mc, mobiles &/or base stations acceptable. Whittier, OX 3-4177. B

**Trumpet**, cornet, or flugel horn in good condition, reasonably priced. Pico Rivera, 695-1445. B

**Drill Press & jointer** for home workshop. Box 202. B

## FREE (To Be Given Away)

**Palm Trees**, 3 miniature. Torrance, 327-4585.

## Rentals Offered

**Duplex**, 2-bdrm., w/wall heater, 1 mile from Norair, close to schools, \$75. mo. Inglewood, PL 4-1611. E

**Apt**, new Medallion, built-ins, 2-bath, water paid, 2-bdrm., \$105 & \$115.; 3-bdrm., \$135. Redondo Bch., FR 2-5310. E

**Apt**, 1-bdrm., furn., 5 min. from Northrop, near elementary school & shopping, h/wood floors, \$89.50 mo. Gardena, DA 9-3436. E

**House**, 3-bdrm., 2-bath, built-ins, fenced yard, no pets, \$140 mo. or lease. Torrance, DA 9-9464, DA 7-8994. E

**Apt**, 1-bdrm., near Northrop, utilities paid, furn., \$75 mo. Lawndale, OS 5-9695. E

**Apt**, upper, unfurn., newly dec., adults, 1-bdrm., \$90; 2-bdrm., \$120. L.A., 678-1596. E

**House**, furn., 1-bdrm., lge. encl. yard, carport, water & rubbish pd., \$80 mo. San Pedro, TE 3-2512. E

**Apts**, 1 & 2-bdrm., unfurn., pvt. balcony, closed gar., soundproofed, hobby shop, hot water & trash pd., \$95 & \$125 mo. Torrance, FR 5-0867. E

**Apt**, 2-bdrm, built-ins, carport, play yard, \$100. Torrance, 320-2827. E

**Apt**, 2-bdrm, furn., gar., laundry, adults, \$130 mo. Torrance, DA 3-7544. E

**Young Woman** to share 3-bdrm. home, near San Diego Frwy., \$65 mo. incl. utilities, Hawthorne, 675-4998. E

**Apt**, lge. 2-bdrm., pool, child OK, stove, refrig., redeco., unfurn. \$125; furn. \$140. L.A., VE 7-4036. E

**Apt**, 1 & 2-bdrm., furn. & unfurn., soundproofed, all elec., closed gar., some w/small fenced yd., 10 mins. to Nortronics PV, \$75-\$145. Torrance, 375-9397, 375-2091. E

**Apt**, delux 2-bdrm., 1¾ baths, built-ins, F/A heating, patio, gar., walking distance from Norair, \$140 mo. Manhattan Bch., 644-1442. E

**House**, 2-bdrm., garage, garb. disp., trash & water paid, accept 2 children, pets considered, near Northrop, \$110 mo. Rolling Hills, 370-4494. E

**Apt**, 1-bdrm., built-ins, 1 mile from Northrop, \$80 mo. Hawthorne, OS 6-8816. E

**Apt**, unfurn., 3-bdrm, 2-bath, built-in oven, gar. & pvt. sundeck, near Northrop, children OK, \$150. Hawthorne, OS 5-7938. E

**House**, 3-bdrm., 1½ bath, built-ins, dble. gar., 1 mile from ocean, lease/option considered, \$150 mo. Redondo Bch., 374-2433. E

**Executive Home**, 2050 sq. ft., 4-bdrm., dining rm., 3-bath, built-in range & dishwasher, prefer 2-yr. lease, \$395 mo. P. V., 377-4372. E

## Rentals Wanted

**House or Apt**, 2-bdrm., unfurn., near #5 bus, in Hawthorne or Inglewood area, would like place by itself, or 1st floor if possible, approx. \$100. Hawthorne, PL 6-0564. F

## Going my way?

### Rides Wanted

8 a.m. — 4:45 p.m.

**Rosecrans & Normandie**, Gardena. Theo M. Terry, Norair, ext. 168, DA 9-1712. 5

**San Bernardino Fwy. & Sunset**, West Covina. R. E. Herfert, Norair, ext. 2515, YO 2-1821. 5

**Manchester & Airport**, Los Angeles. D. J. Hall, Norair, ext. 2385, 645-6815. 5

**Fairview & La Brea**, Inglewood. Louise T. McCulloch, Norair, ext. 2042, 672-2434. 5

**Adams & Brookhurst or Adams & Harbor Blvd.**, Huntington Beach. Gene Dukette, Nortronics, ext. 438, 714-962-3763. 5

**Yorba Linda or Brea on Imperial Hwy.**, Yorba Linda. Cecil P. Wright, Norair, ext. 1217, 528-6113. 5

### Rides Offered

8 a.m. — 4:45 p.m.

**San Bernardino Fwy. & Sunset**, West Covina. R. E. Herfert, Norair, ext. 2515, YO 2-1821. 15

**Adams & Brookhurst or Adams & Harbor Blvd.**, Huntington Beach. Gene Dukette, Nortronics, ext. 438, 714-962-3763. 15

**Yorba Linda or Brea on Imperial Hwy.**, Yorba Linda. Cecil P. Wright, Norair, ext. 1217, 528-6113. 15

**Melrose & Windsor Blvd.**, Los Angeles. C. M. Spindel, Norair, exts. 2522-2521, 465-8028. 15

## NEW YEAR, NEW FACES



Northrop Recreation Clubs at four West Coast facilities are beginning their 1966 programs under the leadership of new officers. Northrop Ventura members have elected (above, from left): Joe Letteriello, Zack Silvers, Tony Piscuskas, and the new president, John Via. Seated are Bob Wilson, Industrial Relations coordinator, Dorothy Prychoda and outgoing president John Lawrence. Norair officers (left photo) are Howard Butler, Bill Lewis and Dick Cade, standing, and Bill Wareing, president, and Jack Wilson, seated. Nortronics officers for Palos Verdes and Hawthorne (below) are: Bart Williams, Dick Teel, Thelma Chambers, Joe Kalina, president, and Bob Marsh. Nortronics Anaheim officers (bottom photo) are Ed Mosher, Chet Guzinski, Bob Benedict, president, Jack Flannagan, and Elaine Steiner.



## Personals

**Thank You** for the many cards, letters, telephone calls & the lovely gift which I received during my recent illness. VERONICA STOCKARD. L

**Engineer** wants roommate to share large apt., prefer part-time student, within walking distance of Norair, \$50 mo. plus ½ utilities. Hawthorne, 644-2592. L

## Personals

**Couple** desires weekend work on sailing craft in need of deckhands, experienced, no wages expected. Hawthorne, 676-7344. L

**On behalf of my family**, we would like to thank everyone for their thoughtfulness & assistance during our recent bereavement. CHET GUZINSKI. L



## Credit Union Board Names Mrs. Delaney

The selection of Mary Delaney to serve as secretary-treasurer of the Northrop Credit Union was announced recently by the board of directors.



Mrs. Delaney

Mrs. Delaney succeeds the late Walter Gage.

A native of Greeley, Colorado, and a graduate of Colorado State College, Mrs. Delaney has been with Northrop Corporation since 1945. After working in Tool Control, Mrs. Delaney joined the Credit Union staff and has served continuously with that organization since 1948. She became assistant secretary-treasurer of the Credit Union in January 1952.

She is currently a member of the Southern California Credit Union Managers Association.

## Wig Show Planned By Women's Club

For Nortronics women (this includes wives of male employees) who are interested in a spectacular night out featuring Old World cuisine in a sumptuous atmosphere, a fashion show of European wigs and an opportunity to win one of several attractive door prizes, your Nortronics Women's Club has arranged the first meeting of the new year on Wednesday, February 10.

A fascinating evening has been planned by the 1966 Women's Club officers who were elected and installed in December. Heading the group as president is Dorothy Peringer with Gloria Munoz, vice president, Rena Larouche, secretary and Florence Correll, treasurer.

The night out will begin with refreshments at 6:30 and dinner at 7 p.m. Rene's Wig Service has graciously consented to model and display the latest fashions in human hair wigs, hair pieces and wiglets imported from Europe with a try-on period following the demonstration.

"I am sure no one will want to miss this rare opportunity to see such a lovely collection," said President Dorothy Peringer. "We expect a record turnout."

Tickets may be obtained from Anita Hulme, Jennie Van Delden, Verda Campbell and Rose Jordan in Y-1; Evie Kovachek in Y-2; and Mary Polk in Y-3.

## SAY, DO YOU REMEMBER...



These Northrop Nortronics veterans recently got together to discuss old times in the conference room of Frank Lynch, vice president and manager of Operations at Ana-

heim. Occasion was presentation of 20-year service pins by Mr. Lynch (right) to (from left): Harold Moore, Robert Andrews, Douglas Cooke, and William Moore.

## MICRODATA SYSTEM LAUNCHED

### Blueprints on the Way Out at Norair

The first step in implementing a new system for distribution of engineering drawings at Northrop Norair was launched earlier last month with the initial release of drawings reproduced from microfilm.

The use of micro-reproduction, which provides new economy data handling, will be limited to engineering drawings and E. O.'s and facility engineering drawings for the present, but other applications will be considered at a later date, according to J. R. Sterling, of Management Services, chairman of the division Microdata Systems Committee, and J. R. Bellevue, director of Graphic services.

The Neoflow System which produces blue background drawings is being completely replaced in favor of black and white drawings. The Reproduction department, which is assigned the task of physical implementation, states that almost two-thirds of the re-

lease time now used by them for drawing reproduction and distribution, will be eliminated.

Eventually, they believe this can be reduced even further. Savings in storage space required is one major benefit. The present drawings on the T-38/F-5 can occupy as much as 1000 square

feet at a print station. With the new system, a complete set of drawings can be stored in a normal tab card file.

Reduced retrieval time will be made possible by installing a microfilm printer at each print station. Each station will have a file of the required aperture cards—IBM keypunch cards containing pertinent information about each drawing with an aperture for the 35mm itself—for making its own prints. This procedure eliminates the need to maintain a supply (one to half a dozen) of each drawing for off the shelf use.

Another major advantage of the Microdata System is that an historical record of every drawing and every change will be maintained. A master file of all negatives will be maintained in a vault by the Graphic services organization. One of the biggest advantages, according to W. H. Posey, general supervisor, Reproduction services, is that the system is basically the same as used by our customers in their operations and requirements.

Mr. Posey states that the major features of the Microdata System are reduced schedule time, reduced cost, ease of handling, reduced storage space requirements, and the ease by which the data can be handled by the users at their work stations, on field trips, and for transmittal to other areas of the plant or to remote operational areas.

## GERMANY BUYS 46 T-38 TALONS

The Federal Republic of Germany and the United States have jointly announced plans to provide all German Air Force jet pilots with supersonic training.

To accomplish this, the German Air Force is buying 46 Northrop T-38 Talon 800 mile-per-hour jet trainers and will conduct its entire student pilot program at Sheppard Air Force Base, Texas, starting in August 1966.

Germany is buying a quantity of subsonic U.S.-built jet trainers for the initial phase of the student pilot program. Student pilots will then advance to the faster-than-sound T-38.

The program will be patterned after the U.S. Air Force pilot training program. The U.S. Air Force has been providing supersonic training since 1961 and already has more than 600 Northrop T-38 jets in service at Air Training Command bases.

Cost of the Northrop supersonic T-38 jet trainers is estimated at \$27 million and approximately \$2 million for initial engines.

## 150 Pints Sought In Blood Drive

Nortronics Anaheim will stage its annual Blood Bank February 18 with bloodmobile activities centered at Building Y1.

Goal of the drive is to obtain 150 pints which will be sufficient to handle normal needs for the coming year. Sign-up cards for donors are being distributed this week.

## NRC Holds Combined Installation

Northrop Recreation Clubs at Nortronics rolled into another year of activities last month with formal installation ceremonies for new officers, commissioners and representatives.

The affair was held at the Long Beach Elks Club and drew some 130 persons. It was the first installation dinner in which NRC

See photos below.

Councils from both Anaheim and Hawthorne-Palos Verdes participated jointly.

Dick Williams, representing Hawthorne, and Randy Lee, Anaheim, served as masters of ceremonies.

Past presidents of the two Councils, Earl Bird and Bill Kieffer, served as installing officers for their successors, Joe Kalina and Bob Benedict of Hawthorne and Anaheim respectively.

Bill Burch, Nortronics chief of Employee Relations presented the traditional gift to outgoing presidents. Earl and Ruth Bird received a tape recorder, Bill and Jeanne Kieffer, a portable TV and handbag.

Industrial Relations Director Elmer Noonan expressed his appreciation to the volunteer recreation leaders for their services and welcomed new Council members.

Mary Harvey and Linda Stapleton served as hostesses for the dinner-dance activities.

Other officers installed were: Hawthorne, Dick Teel, vice president; Thelma Chambers, secretary; Bart Williams, treasurer; and Bob Marsh, sergeant-at-arms. Anaheim, Ed Mosher, vice president; Elaine Steiner, secretary; Jack Flannagan, treasurer; and Chet Guzinski, sergeant-at-arms.

## MEXICO

(Continued from page 1)

minister in the United Fundamental Church. While his church supports his missionary effort, it has no funds to aid it. Thus, Mr. Bustamante makes each trip (often more than 700 miles) on his own, paying his gas and other expenses from his own pocket.

"I was born in Carlsbad, New Mexico, but I am a Mexican and these people are my people," Mr. Bustamante said. "I am repaid many times over for my work in just knowing I am being of service to people who, through no fault of their own, really need help."



LIKE CHRISTMAS IN JANUARY—Bill Burch (left), Nortronics chief of Employee Relations, was busy last month with passing out traditional gifts to outgoing NRC presidents and their wives. Ceremony was part of annual installation dinner attended by NRC Council members from Anaheim and Hawthorne-Palos Verdes. At left Mr. and Mrs. Earl Bird are joint recipients of a tape recorder.



Bill Kieffer beams in center picture upon acceptance of portable TV. Mrs. Kieffer (right) received handbag. Mr. Bird was NRC president for Hawthorne-Palos Verdes, while Mr. Kieffer filled a like spot at Anaheim. Dinner drew 130, was largest held for installation purposes in a number of years. Event was staged at Long Beach Elks Club as a full-scale dinner-dance.





# C-5A Navigation System Program Begins at Hawthorne

## NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California

Vol. 24, No. 3

February 16, 1966

### DISPLAY SYSTEM TO PORTRAY X-15 TEST MISSIONS

A display system that will graphically portray the life of X-15 flights from B-52 liftoff through burnout and landing is being developed by Northrop Nortronics.

The display system will provide real-time, multicolor presentations of all phases of the X-15 experimental flights at NASA's Flight Research Center, Edwards Air Force Base. The rear-projection system also will depict chase plane pursuit on the display screen during the X-15's flights.

Mission data, received from range radar tracking stations, is processed through a computer for immediate projection onto a 4-by-5 foot viewing screen in the control center.

A background map of the Edwards Test Range will provide reference information on the four-fifths of the screen used for actual tracking of the rocket research aircraft and the chase planes. The remaining one-fifth of the screen will profile the X-15 mission against altitude reference.

Four Nortronics Vigicon plotting projectors will trace the X-15's flight path, while three "spotting" projectors will provide instantaneous chase plane position. A reference projector will superimpose the test range map onto the screen.

Three of the Vigicon plotters will be used to project the mission onto the screen in three different colors, one for each mode of the mission — B-52 takeoff, X-15 launch-trajectory, and X-15 burnout-landing. The fourth plotting projector will display any symbology which represents important events occurring during the mission.

### Hourly Personnel Get Cost of Living Raise

A two-cent per hour increase for all hourly-rated personnel at Northrop Norair and Nortronics West Coast installations became effective February 7.

The increase resulted from an upward adjustment made after the Bureau of Labor Statistics Cost of Living Index for December 1965 climbed 1.0 points above the June 1965 Index.

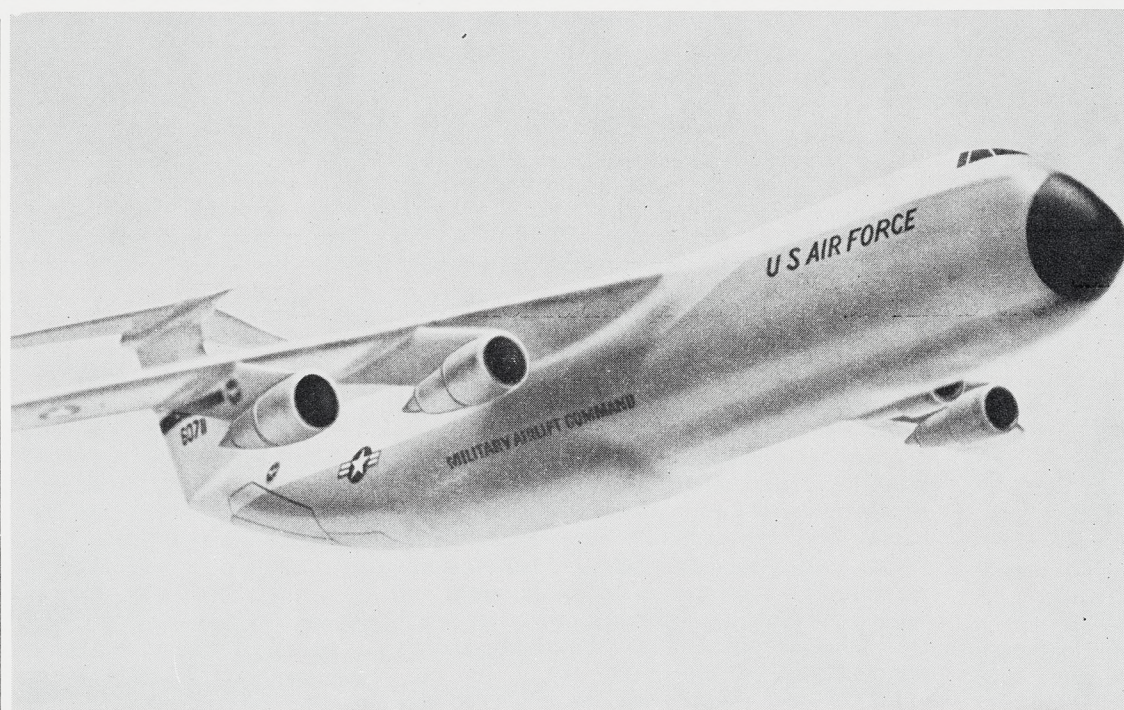
### BUILDING HIS OWN SLOOP

## Ed Grant Maps Honolulu Yacht Race

When the Trans-Pacific Yacht Club's internationally famous Honolulu race gets under way in July 1967, Ed Grant will be in it.

The Nortronics mechanical engineer will be sailing master of a racing sloop, designed by him, that exists only on paper today.

The yacht in question, The Torch, will be a lean 60-foot ocean racer with its hull configuration drawn from the experimental 32½-foot "Little" Torch. The smaller Torch captured four firsts and two seconds in the six races of the Cabrillo Beach Yacht Club 1965-66 winter series.



ARTIST CONCEPTION OF C-5A—Powered by four General Electric TF39 fanjet engines generating a total of 160,000 pounds of thrust, Lockheed-produced C-5A airfreighter (now under development) is seen as an artist envisions it will appear in U.S. Air Force service. The C-5A will transport 110,000 pounds of cargo across the Pacific or Atlantic and land on relatively unprepared fields in remote sections

of the world. The new 700,000-pound aircraft is being developed under direction of the Air Force Systems Command's Aeronautical Systems Division. It is scheduled to be delivered to the Military Airlift Command in 1969. Dimensions of the C-5A: 237 feet long; 63 feet high, and 223-foot wing span.

Photo courtesy of Lockheed

### ULTRA PRECISION TEST LABORATORY TO BE DEVELOPED

A feasibility study for an inertial guidance laboratory that will develop and test systems for next generation's space probes is being conducted by Northrop Nortronics Precision Products Department (PPD).

The laboratory will be at NASA's Electronics Research Center, Cambridge, Massachusetts.

PPD will make a complete feasibility study, including recommendations on the laboratory's design, geological surveys of the area, types of test equipment needed and estimated cost of the facility.

PPD has already designed and built two inertial guidance test facilities—one for the Navy's Applied Science Laboratory and a second laboratory at Nortronics' Norwood plant. The labs, called Ultra-Precision Test Equipment (UPTE) facilities, are recognized as two of the most modern in operation.

### TEAMS Makes Debut Run For Elite Navy Audience

Northrop Nortronics' new TEAMS system made a highly successful debut February 2, performing before an important audience on hand for a combination TEAMS program review and demonstration at Anaheim.

Led by Captain D. S. Sterrett, USN, director of Warfare Systems, U. S. Navy Bureau of Ships, the visitors included key military and civilian representatives of every major organization destined to play a part in the application, testing and ultimate deployment of TEAMS with the Navy.

TEAMS (Test Evaluation and Monitoring System) is the newest application of the Nortronics DATICO concept of automatic testing.

The Navy's Bureau of Ships has ordered more than a score of the advanced automatic checkout units for use on a new class of destroyer escort. TEAMS is designed to provide on-line monitoring of up to 10 major electronic systems aboard these vessels.

Nortronics arranged a special demonstration area to simulate as near as possible a TEAMS operational environment like that to

be found aboard a destroyer escort. Special bulkheads were erected to segregate TEAMS from the units it was monitoring. Then the TEAMS unit was put through its paces under the watchful eyes of the audience.

"Post-demonstration comments from those taking part were highly commendable," said W. R. Peterson, Nortronics director of Automation Systems.

During the full-day program key Nortronics personnel handled special assignments.

E. J. Norman, chief of Automation Systems Applications, and Commander W. D. Buckbee, USN, DCASO chief at Nortronics, made opening remarks and introduced participants and guests.

F. W. Lynch, Nortronics vice president and general manager—Operations, outlined Northrop's Corporate structure and explained Nortronics' TEAMS organization.

W. P. Van Ordstrand, TEAMS Program manager, gave a run-down on the TEAMS program status. H. L. Withee, TEAMS project engineer, gave a technical description of the TEAMS system.

Mr. Norman also traced Northrop's work and experience in the field of automatic test equipment.

P. F. Boggess, supervisor of Engineering Research and Development, discussed company-sponsored programs related to TEAMS and N. S. Bishop, supervisor of Test Programming, told of TEAMS software developments and plans.

Mr. G. Margulies, BuShips (See TEAMS, page 8)

### \$20 Million Contract Let By Lockheed

A contract in excess of \$20 million has been awarded Northrop Nortronics by Lockheed-Georgia Company for the doppler-inertial navigation system for the Air Force C-5A fanjet cargo carrier.

The 700,000 plus-pound C-5A is now in development at Lockheed's Marietta, Georgia plant. The plane will have a capability of carrying a 250,000 pound payload and will cruise up to 550 miles per hour.

Nortronics' contract calls for development, test and production of the system, which will be the heart of the C-5A guidance system.

Lloyd Balsam, who managed the Division's proposal effort, has been named program manager. The remainder of the C-5 staff, presently being formed, will be announced later, according to Vice President Ross Miller.

In addition to Mr. Balsam's "outstanding effort," Mr. Miller praised the support of Herb Bansbach, applications engineer; Roy Kaufold, proposal engineer; Gerard DuKet, director of contracts; and Frank Caramelli, who assisted with the cost estimate.

"While it is obvious that many individuals contributed to this significant award, these men would have to head my list of persons who contributed most to our getting this contract," Mr. Miller said.

As for the technology that will go into the guidance system, Mr. Miller traced its development back to the early 1950's when Northrop's pioneering work in inertial navigation systems was applied on the Snark missile.

Two separate, yet closely inter-related, technical disciplines have evolved into the present equipment. These are lightweight digital computers and inertial platforms.

Since 1948, Nortronics has pioneered in digital computer developments. These led to APAC, the world's first transistorized missile-borne digital device in 1957. Many of the men who were part of that team today form the nucleus of the Nortronics Computer group at Hawthorne.

Major milestones since then (See CONTRACT, page 8)

### Thompson Shoots 70 To Take Golf Honors

Harry Thompson shot a net 70, two strokes better than Bob Yarbrough January 29 to win honors in the first flight of an NRC-sponsored golf tournament held at Peppertree Country Club, Corona.

Second flight honors fell to Bill Christian with a net 71, while Ralph Hamrick placed second with a net 72.

Joyce Benedict won the women's flight with a net 83.



## FRINGE BENEFITS

## Grievance Procedures Open Hot Line to Management

By WILLIAM LARRABEE  
Vice President—Industrial Relations

Up to the present time we have been talking about fringe benefits which mean money to us and our families, such as retirement, group insurance, and savings plans. There are more of these which we will get to in the future, but a letter which I just received started me thinking in a different direction. A large oil company in Texas wrote me, stating that it had been examining grievance procedures throughout the country and that Northrop's gave the employee the very best of opportunities to present his problems to management and to correct supervisory mistakes or misunderstandings affecting his job. This brought to mind the fact that the ability to be heard and to be protected in one's position is just as important as any of the other benefits which we have at Northrop.

The reasons why Northrop goes to such lengths to protect its people are pretty clear. In the first place, your management believes that Northrop people should be treated as individuals and that whatever is important to our people is equally important to our company. Furthermore, your management knows that a worker with a grievance or problem on his chest and on which he can't get a real hearing spends more time brooding about his problem than he does in constructive work. This is plain human nature. Lastly, supervisors make mistakes just like everybody else and no one would want such a mistake to work unjustly to the detriment of the employee or result in the loss to the company of a good employee.

Therefore, the Northrop grievance procedure was set up for nonsupervisory nonbargaining-unit personnel. Every such employee is assured that he can go straight through to company top management, get a fair hearing, and if he is not satisfied with the decision he can request a hearing before an outside arbitrator, with the company paying the arbitrator's fee and expenses.

The grievance procedure is published in detail in Working with Northrop, but generally speaking here is how it works: Let us suppose that one of the people in our plant thinks he is being laid off by his supervisor improperly under the company regulations. His first impulse, of course, is to be mad and upset, but when he has thought the situation over, and not later than seven days after the event happens, he should go to his supervisor, tell him that he intends to follow the company grievance procedure and tell the super-

visor just why he thinks he is right and the supervisor is wrong.

He may do this either in writing or orally. Perhaps the supervisor will be convinced or will have another solution to the problem. In any event, the supervisor must make a decision within the next seven days. Incidentally, the employee may obtain assistance from his Industrial Relations office in connection with this first step if he so desires.

If the employee is still unhappy with his supervisor's decision, he should then go right away to the Industrial Relations people in his division who will give him some forms to fill out and will help him summarize his problem, his supervisor's decision, and the action which the employee wishes the company to take.

Industrial Relations people then go into the matter very thoroughly, consult with all appropriate sources of information, perhaps call a conference with the employee and various supervisors, and attempt to reach a satisfactory adjustment. If a mutual satisfactory solution is not worked out, then the supervisor's superior, called the "Administrative Officer", must make a decision and notify all concerned.

Let us now assume that the employee still isn't satisfied with the decision reached. He then tells his Industrial Relations people that he wishes to go before the Management Appeals Committee, thereby getting the opportunity to discuss the problem openly with the top management of the company. This committee is made up of three people.

As Corporate vice president - Industrial Relations, I usually represent our president, Mr. Jones, on the committee. The employee's director of Industrial Relations is a member of the committee. The third member of the committee is usually the head of the department concerned. For instance, in Norair, the committee might be made up of Jack Mannion, manager, Manufacturing and Materiel department; Paul Crews, director of Industrial Relations, and me. In Nortronics, it might be Frank Lynch, vice president and manager - Operations; Elmer Noonan, director of Industrial Relations, and me.

This committee really goes into the employee's problem. It listens to his case and any witnesses he wishes to bring in. It calls in the supervisor and, in short, gets every bit of information.

(See FRINGE BENEFITS, page 6)



## BUDDING ACTRESS, 7 MONTHS, GETS FIRST PUBLICITY

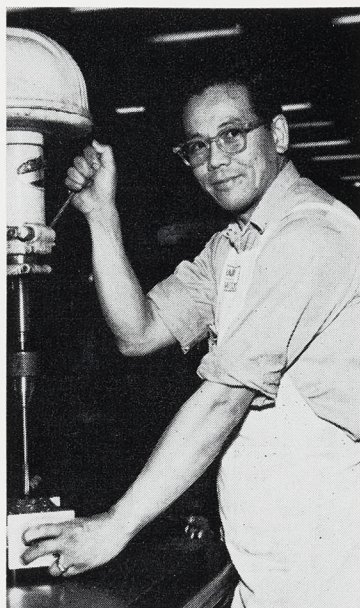
Kristine Ritzke got what she went after—a Social Security Card—and captured a few hearts in the process.

Which is not bad for a seven-month-old budding actress.

Kristine is the daughter of Raymond (a Norair Materiel employee) and Jeanne (a professional model) Ritzke. Her parents decided to try her luck as a model and perhaps television actress. She needed two things: a membership in the Screen Children's Guild and a Social Security Card.

She got both, but only after creating a sensation as the youngest applicant ever to be served at the Inglewood Social Security office.

## FEATURED SUBJECT



Roy Nitta, drill press operator in Northrop Norair's Machine Operations, will be featured in a forthcoming publication of the California School for the Deaf. Mr. Nitta is a graduate of that school and has forwarded biographical information and a photograph to be used in book covering graduates who are currently working in industry.

## Travelers, Take Heed, Full Year Ahead

Whether your interest lies in a 15-day tour of Old Mexico or a 33-day junket around the world, Northrop Travel Clubs invite you to a 7:30 p.m. meeting February 23 at the NRC Clubhouse, Hawthorne, for further details.

Jeanne Andrecht, NRC commissioner at Nortronics Hawthorne, indicates the meeting will feature films and representatives of travel agencies affiliated with these two NRC-sponsored trips for 1966.

The Mexico visit begins April 29 and costs \$320 for jet air fare, lodgings and some meals.

Jet air fare, lodging, sightseeing and many meals are available for the \$1495 fee for the around the world trek departing September 2. Brochures on both trips are now available through Personnel Activities outlets.

## Toastmasters Move Meetings to Cafeteria

Northrop Toastmasters Club has changed its regular Thursday (6:30 p.m.) meeting site from the Cockatoo Inn to Northrop Norair's cafeteria (the executive dining room), President Ron Klein reports.

## Northrop Posters In DOD Display

Northrop Corporation cost reduction ideas will be displayed at the Contractor Cost Reduction Exhibits associated with the forthcoming series of Advanced Planning Briefings.

The annual event is sponsored by the Department of Defense with the National Security Industrial Association as hosts.

Beginning March 3 and 4 at the Sheraton Boston Hotel in Boston, the exhibition will continue to San Francisco and Washington, D. C.

The eight Northrop 30 x 40 posters will travel to the Fairmont Hotel, San Francisco, April 12 and 13, and then to the Sheraton Park Hotel in Washington April 27 and 28.

Norair Graphic Services, headed by John R. Bellevue, is preparing the artwork. In 1965 several Northrop posters were selected for display in the Pentagon following the Advanced Planning Briefings.

## CASA TO PRODUCE F-5

# Spanish Program Gains Momentum as Team Departs

Northrop Corporation is now moving swiftly in carrying out early commitments associated with the manufacture of F-5 tactical fighters in Spain for the Spanish Air Force.

At Northrop Norair a considerable quantity of technical data is being compiled, master tools and fixtures are being fabricated, orders are being readied for long lead-time items, and last week the vanguard of a Northrop Technical Assistance Team arrived in Spain.

Program activities accelerated recently following the reaching of final agreements.

Behind these agreements lie more than a year of detailed study, analysis, planning and discussions involving many Northrop elements working closely with representatives of Construcciones Aeronauticas S.A. (CASA) of Spain.

CASA, Spain's leading aerospace firm, is the prime contractor to the Spanish Air Force and is teamed with Northrop and General Electric (for engines) in this venture through a special licensing agreement.

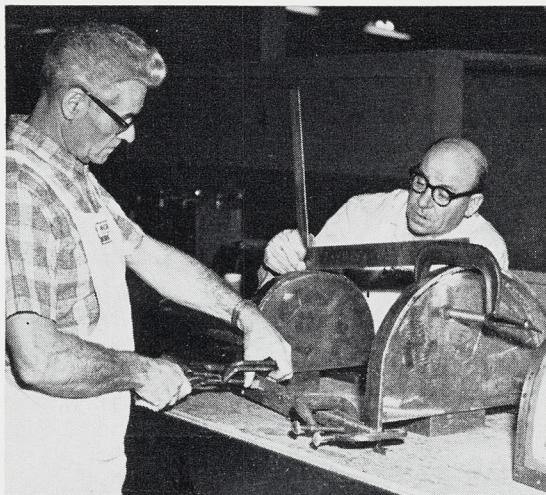
This program will produce 70 supersonic tactical fighters, both F-5A's and F-5B's, for the Spanish Air Ministry

(Northrop NEWS, January 20, 1965).

The over-all program extends through 1970.

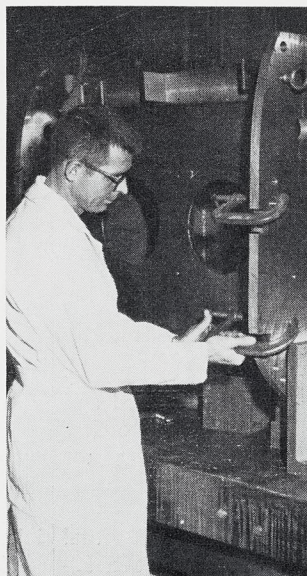
Paul Jacobs, Norair's deputy division program manager responsible for the Spanish program, said:

"In the months ahead the Spanish effort will require contributions of an exacting nature from groups and individuals in many functions—Technical, Production and Administration."



MASTER TOOLS—Fabrication of large numbers of master tools to be used by CASA is performed by J. L. Stevenson and Harvey Hemmingsen (above) and Jim Hammond (right).

Mr. Jacobs pointed out that early program requirements call for Northrop to ship "knock-down" aircraft and components to CASA. That is, initially systems, components and structures built at Norair, Nortronics and Ventura Divisions and by F-5 program subcontractors will go to Spain in much the same form and condition as F-5's currently moving between Hawthorne and Palmdale.



In the next phase complete aircraft structures will be shipped. Still later, detailed aircraft parts will follow the same route.

Throughout the life of the program Northrop will supply CASA with finished materials, purchased parts, aircraft equipment and selected raw stocks as required.

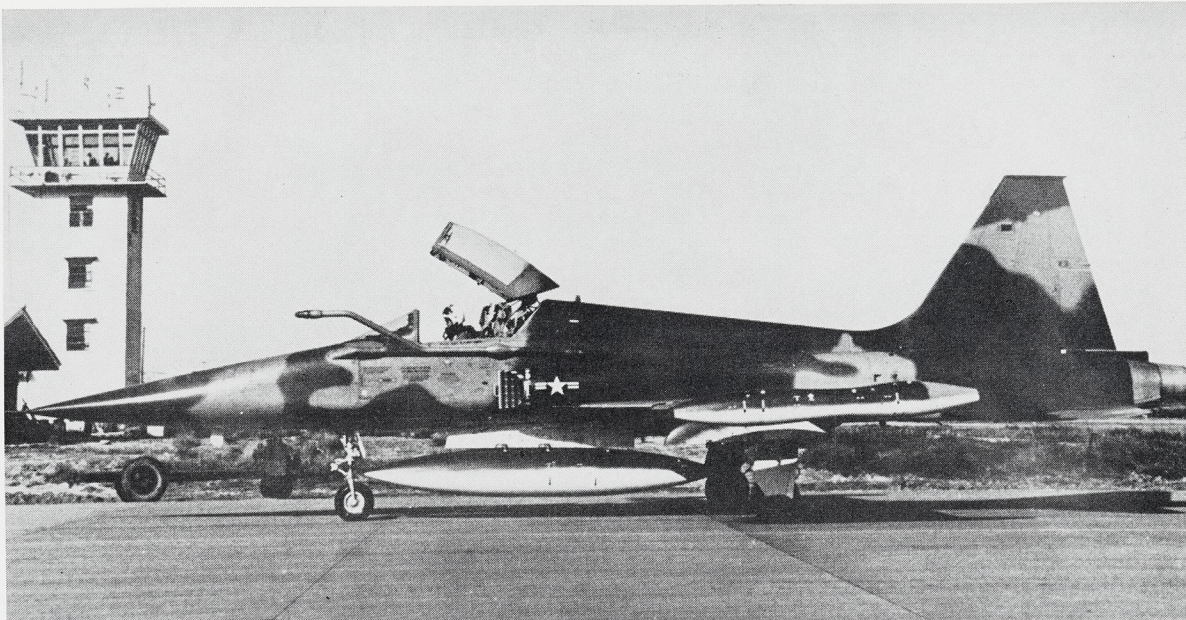
Juan Alonso Pesudo, CASA's F-5 program manager, and other CASA officials have worked closely with Northrop officials over the past year to work out even the smallest details of the program. Northrop's Mike Creamer, George Schnug, John Breneman, Don Vivrette, O. P. Omley, Paul Jacobs, Gid Kelley, Mannie Gonzalez, Bill Cunningham, Scott Johnson and Fayze Fandey have led planning phases, working closely with many other Northrop individuals on the program.

Mr. Omley, Norair's manager of International Operations department, calls the over-all program outlined in final agreements a "building block approach."

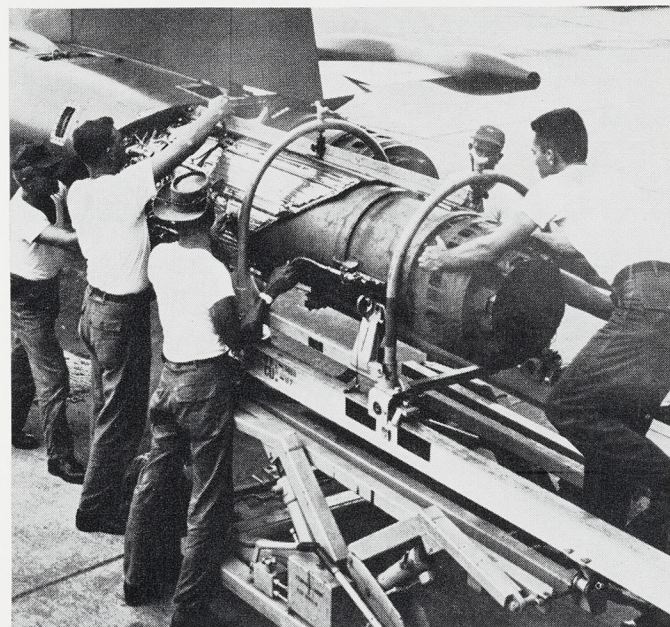
"It calls for a well-defined series of progressive steps leading to the establishment of an F-5 production capability at CASA that is identical, although somewhat smaller, to that at Norair,"

(See CASA, page 5)

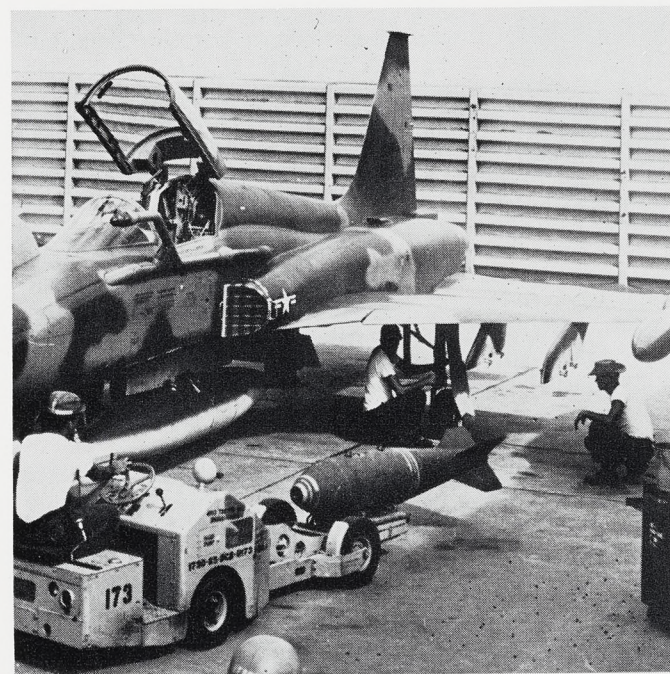




Awaiting signal from control tower to take off, a Northrop F-5 in full-battle dress (above) is set for one of the more than 2000 sorties credited to the fighters participating in Project Skoshi Tiger. Planes are piloted by members of the 4503d Tactical Fighter Squadron. During his Christmas visit to Vietnam, Bob Hope (left photo) stopped by Skoshi Tiger flight-line for chat with Captain Leonard Wilson, a 4503d pilot.



A complete change of engines (above) is quick and easy. Two-engine design of F-5 has been credited by 4503d pilots with bringing them and the plane back in one piece when one engine was damaged. Turn-around time which includes getting a new load of bombs (below) takes less than an hour in most cases.



Northrop technical representatives assigned to Project Skoshi Tiger are (from left): Jim Bateson, Ralph Troxel, Clarence Johnson, Don Kindy and Bob Purcell. Ike Houts, the sixth team member, is not shown. Members of 4503d open gift packages (right photo).

## Skoshi Tiger Squadron Completes 2000th Sortie Over Vietnam

Northrop F-5's in Vietnam completed their 2000th sortie earlier this month in Project Skoshi Tiger.

Captain Miles E. Withrow of the 4503d Tactical Fighter Squadron led the flight of three F-5's on a strike against a Viet Cong concentration about 46 miles south of the Bien Hoa Air Base.

According to an Air Force announcement, the pilots destroyed six structures and damaged four others during the mission.

The planes arrived at Bien Hoa October 23 of last year and within hours after setting down, two of the planes were away for their first mission.

Since their arrival in Vietnam, Skoshi Tiger pilots have been credited with destroying about 1500 buildings and damaging more than 1300 others.

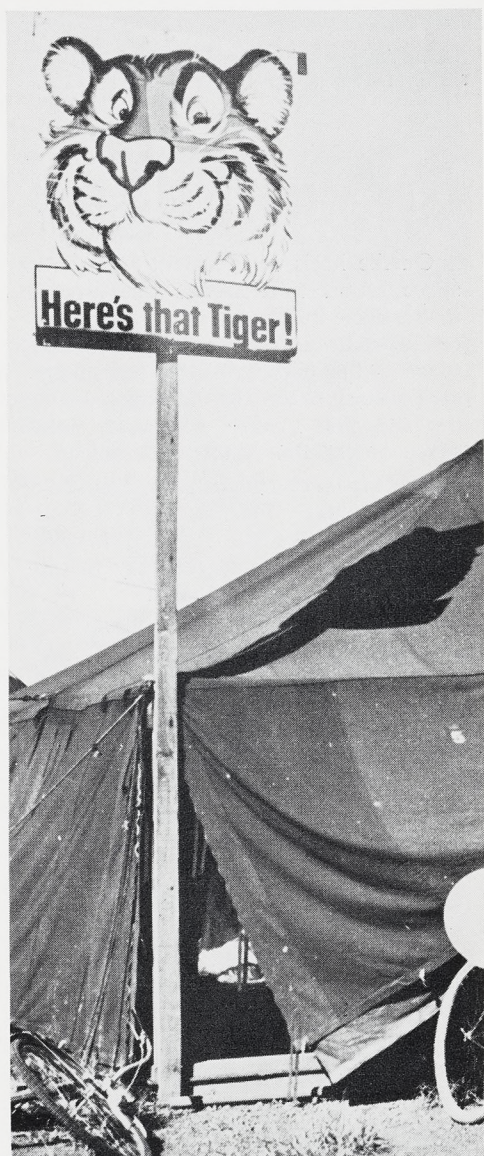
On the same day the 2000 sortie was being flown, Northrop President and Chairman Thomas V. Jones was praising the Air Force's logistics support of Project Skoshi Tiger.

Mr. Jones said that the Air Force Logistics Command has accomplished "a mission that could easily have been described as improbable."

Writing to General Kenneth B. Hobson, AFLC commander, Mr. Jones pointed out that the deployment of the F-5's to Vietnam was carried out with no deterioration to the still expanding Military Assistance Program, the primary user of the Northrop tactical fighter.

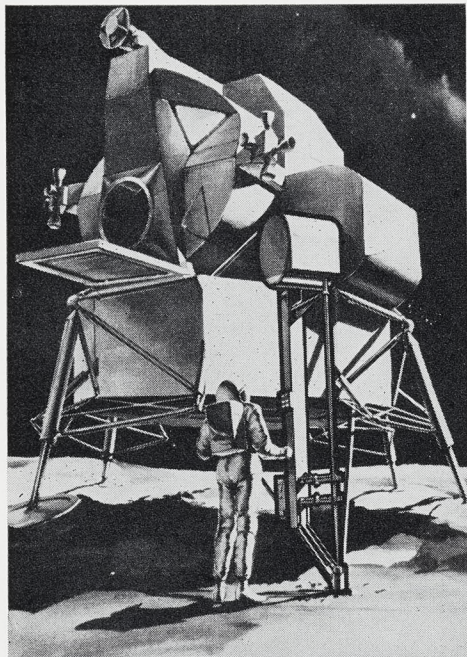
"Support of Skoshi Tiger to the range and depth required in the extremely short span of time from inception of the program to the on-site operational ready date was a mission that could easily have been described as improbable. To have all unit mobility packages deploy 100 percent filled, and the backup support package over 97 percent complete, is the finest display of logistical support that I have ever experienced," Mr. Jones said.

Mr. Jones also extended his congratulations to Colonel Cletus Wray, system support manager for the San Antonio Air Materiel Area, Kelley Air Force Base, Texas, and Major Robert Alexander, F-5 project officer. SAAMA, commanded by Major General Frank E. Rouse, is responsible for worldwide logistics support to the F-5.



Two faces of Skoshi Tiger reveal sense of humor is retained in war-time environment by men of 4503d. Huge sign (above), which graces supply tent at air base in Vietnam, was borrowed from Humble Oil & Refining Company, originator of one of many commercial campaigns involving tiger image. A 4503d pilot (below), who is pointing out damage to plane from ground fire, wears official Skoshi Tiger emblem on his sleeve which doesn't look quite so friendly.

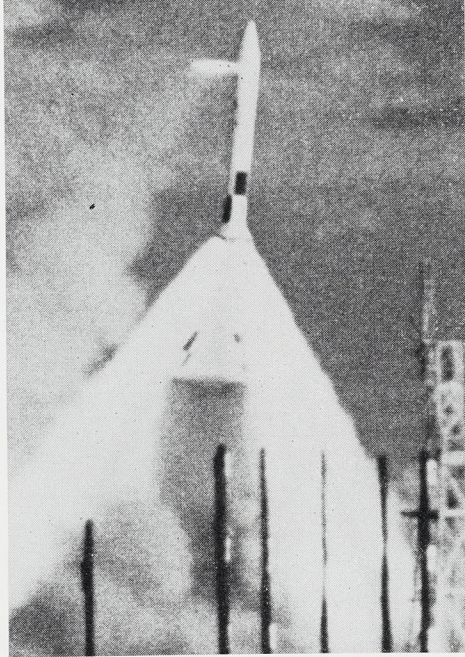




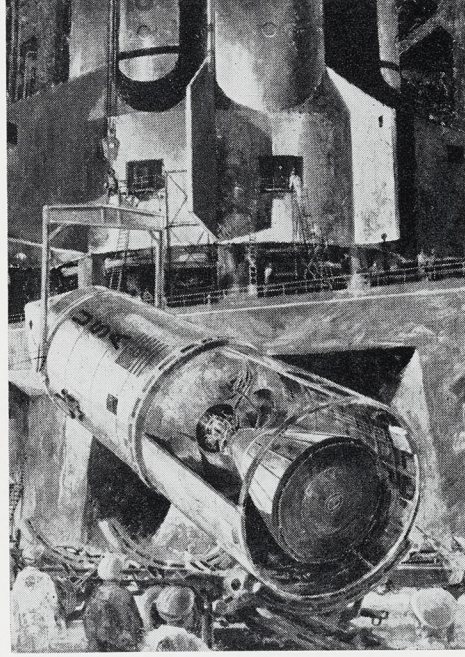
Northrop's lunar drill concept (outlined in black) shown attached to Lunar Excursion Module (LEM).



Delores Caldera of Northrop Ventura's Paralab is framed by Apollo parachute.



Launch escape motor containing Q-ball, pulls Apollo flight model to safety in abort test.



Mated command and service modules of Apollo spacecraft are elevated to top of giant Saturn.

### SATURN 1B BOOSTER GETS TRIAL, TOO

## Apollo Edges Closer to Moon With First Launch at Cape

On the heels of President Johnson's space report to Congress this month that major milestones are being met on schedule in efforts to get to the moon in this decade, NASA tentatively set February 22 as the date for launching the first Apollo spacecraft into space on the first Saturn 1B vehicle.

The unmanned flight from Kennedy Space Center, Florida, will extend 5000 miles over the Atlantic Missile Range with parachute recovery in the vicinity of Ascension Island.

Northrop Ventura, developer of the Earth Landing System (ELS) for Apollo, is one of 14 major subcontractors, and Northrop Nortronics and Northrop Space Laboratories are supplying components and technical support which range from sensors to concepts of complete lunar logistics packages.

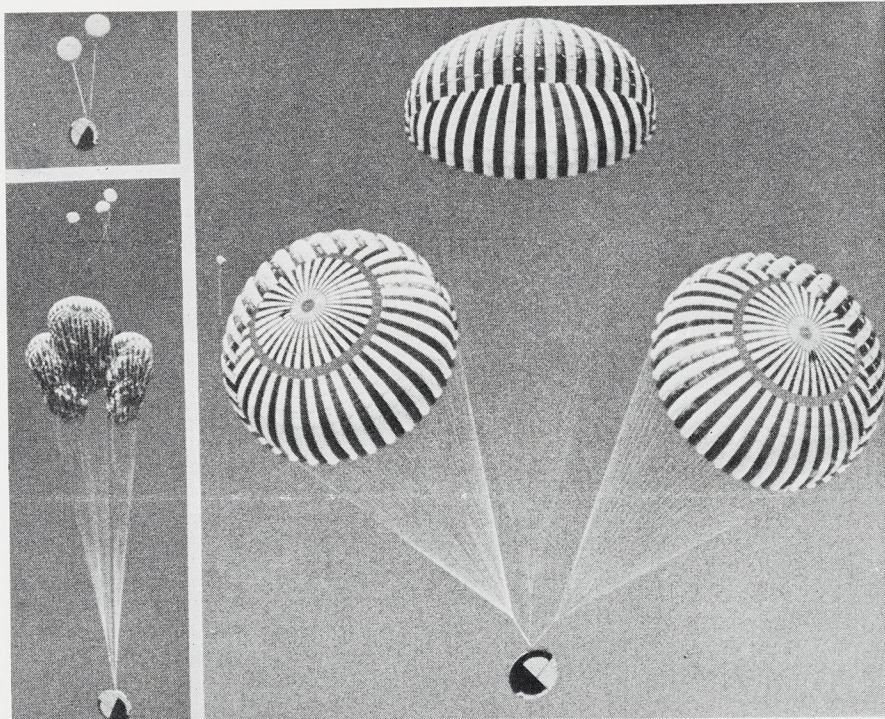
The flight this month by Spacecraft 009 will be flown unmanned in the first test of a series to prove Apollo's capability to withstand the 5000 degree re-entry temperatures expected on a lunar flight.

North American Aviation is prime contractor for the Apollo spacecraft, and Chrysler Corporation is prime contractor for manufacture of the Saturn 1B booster.

Northrop Space Laboratories is about mid-way through a program for NASA to assess the effects of vacuum exposure for extended periods of up to 90 days and re-entry on the Apollo heat shield material.

The program is a joint effort of NSL's Space Materials and Plasma Science laboratories. A plasma jet, designed and built by Northrop, simulates the heat of re-entry on test samples in a vacuum chamber.

The Space Labs are also engaged in a four-month design study contract on



Three main steps in Apollo Spacecraft 009's earth landing system are shown in these photos taken with telescopic camera during high altitude drop test at El Centro, California.

an experiments pallet to fly aboard Apollo missions. The contract calls for NSL to design, develop detailed specifications for and produce a mock-up of a pallet to be placed in the Apollo spacecraft service module.

Flights using the pallet, which will allow for additional scientific explorations during lunar journeys, are scheduled to start in 1968.

Northrop's pallet design is competing with those of three other firms for a major NASA contract.

At Huntsville, Alabama, where NSL maintains a technical support facility, Northrop has performed numerous studies of launch systems, lunar logis-

tics payloads, conceptual designs and system analyses which relate to both the current phase of the Apollo program and what is known as the Apollo Applications program.

A Huntsville team is presently developing a unique and compact drill with which future Apollo astronauts may sample the lunar crust to depths of 100 feet or more.

Northrop, along with one other industrial contractor, will develop and manufacture an engineering model of the compact drill under contract to NASA's Marshall Space Flight Center in Huntsville.

The geological research tool will be

used in the Apollo Applications program for manned lunar exploration after the initial manned landing.

Research into man's physical capabilities on the moon is in progress at NSL Hawthorne, using a 1/6 lunar gravity simulation facility.

NSL also is conducting research on support restraint systems under contract to NASA. Crew seating and crew protection in spacecraft are being studied. Northrop scientists are continuing research into methods of thermal transport and combinations of thermal transport with the support restraint systems. This work is leading to the development of new types of suits for space crews.

Since much of Northrop's work in support of a manned lunar landing will not be applicable until later in the program, Northrop's major contribution to the 009 launch will be the parachute recovery system.

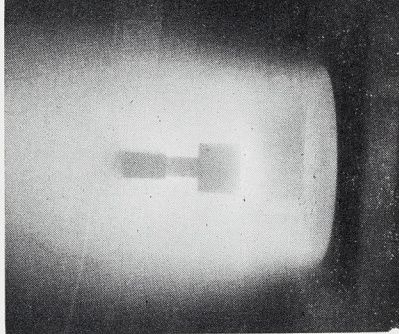
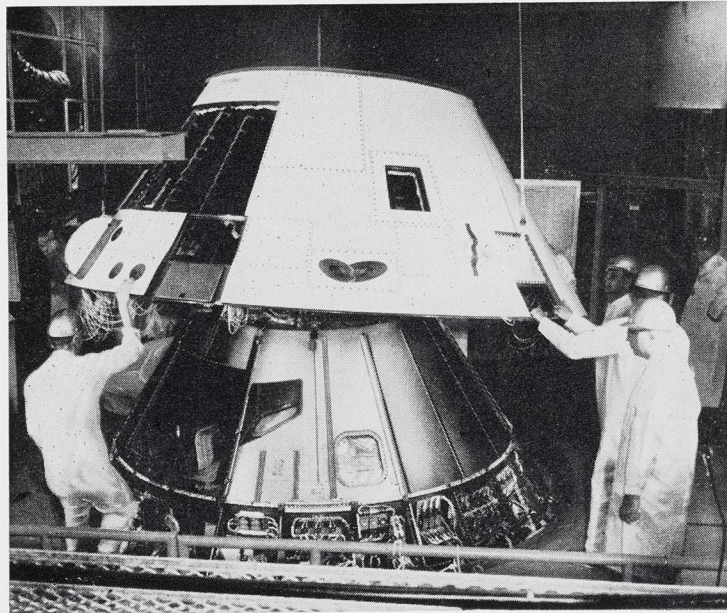
Eight separate parachutes are involved in the landing sequence which begins at approximately 25,000 feet while the spacecraft is descending at approximately 18,750 miles per hour.

At 25,000 feet, a barometric pressure switch fires an explosive charge to jettison the apex heat shield over the parachute compartment. Two seconds later, two 13-foot diameter drogue parachutes are deployed by mortar for stabilization and deceleration of the descending command module.

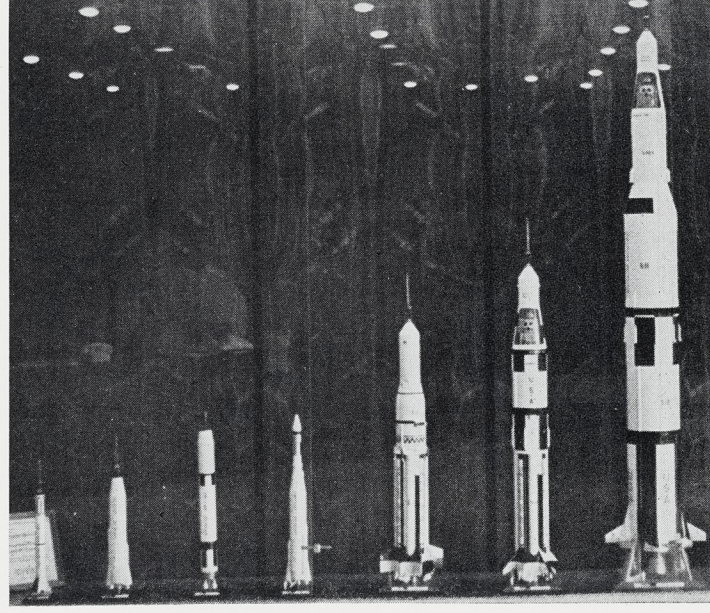
At approximately 10,000 feet, three pilot chutes, seven feet in diameter, are deployed, also by mortar. Each pilot chute pulls a main 83.5-foot Ringsail parachute from its container.

Northrop Nortronics also will be making some contributions to the program further down the line, but will have hardware involved in this month's launch, too.

(See APOLLO, page 5)



One of three sections that make up outer heat shield of Apollo spacecraft is lowered into place (left). Plasma jet gives heat shield ablative material a taste of re-entry heat (above) at NSL. Evolution of space boosters, in Cape display (right), shows steady advancement from Redstone (far left), which placed Mercury in sub-orbital flight, to Saturn V (far right) which will start Apollo on its moon voyage. Apollo, mated to Saturn 1B, is second from right.





## While F-5's Scorch In Asia, 4 Shiver On Polar Flight

The recent "high flight" of four Northrop F-5 fighters to Iran was, in a way, complementary to the operation of the aircraft now under way in Vietnam, according to an Air Force release from Williams Air Force Base, Arizona.

The Viet-based squadron is operating under some of the worst heat and humidity conditions, while the Williams-to-Tehran flight was accomplished over the fog-bound, blizzard-raked North Atlantic route. It was the first time U.S. Air Force pilots had flown the fighter over the route.

The four F-5's were being delivered to the Imperial Iranian Air Force under terms of the Military Assistance Program.

The flight was commanded by Major Bill Gillette, a veteran of 19 North Atlantic crossings since 1953. Other pilots were Captains Dick Lougee, Jan Holley and Bill Gilbert.

Stops on the trip included Langley Air Force Base, Virginia, where the pilots received their final briefing, Loring AFB, Maine, Goose Bay, Labrador, Keflavik AB, Iceland, Prestwick, Scotland, Chateauroux AB, France, and Athens, Greece.

At Loring, the pilots were greeted with six feet of snow. Over Greenland the temperature was 30 degrees below zero.

"The aircraft were functioning properly," one of the pilots from balmy Arizona said, "but we couldn't say the same for ourselves."

On refueling and maintenance stops, turn-around time was less than an hour on most all occasions, the Air Force said.

The planes arrived at Tehran at the exact arrival time specified in the advance itinerary.

The pilots, assigned to the 4441st Combat Crew Training Squadron, Tactical Air Command, returned with praise for the F-5 "which is proving itself at all times and under all conditions," the Air Force release said.

## QUICK RESPONSE



Ventura County firemen, responding to a Northrop Ventura alarm in three minutes, found that the Division's Fire Brigade already had an aluminum particles fire under control. Brigade captains Buck Gilmore and Ray Escott were first on the scene. It was believed the fire started when sparks from a metal saw ignited a box of fine aluminum powder.

## NSL Selects Bell For Subcontract On Pallet Study

Northrop Space Laboratories which is now carrying out a four-month design study contract for an experiments pallet to fly on Project Apollo missions, has selected the Bell Aerosystems Company of Buffalo, New York, to assist in extra-vehicular operations studies.

Bell Aerosystems will assist in performance of tasks related to crew and mission integration; human factor studies; analysis of astronaut utilization training; and simulation activities.

The pallet, to be placed in the NASA Apollo spacecraft service module, will house scientific, technological and engineering experiments to be carried on missions of up to two weeks' duration, beginning in 1968.

After review and evaluation of the design studies, NASA plans to select an industrial contractor to develop the Apollo experiments pallet flight hardware under a cost-plus-incentive-fee contract.

Another major subcontractor in the Northrop study is Radiation, Inc. of Melbourne, Florida, responsible for data management and communications systems.

## AD ASTRA PER ASPERA

# AF Symposium Held at Hawthorne; Software Breakthrough Told in N.Y.

By the Northrop News Staff

A classified technical symposium, sponsored by the Air Force Systems Command in conjunction with the annual winter conference of the Institute of Electrical and Electronic Engineers, was held earlier this month by Northrop Norair.

The regular WINCON technical sessions, co-sponsored this year by the IEEE Los Angeles section and the Aerospace and Electronics Systems group, were held at the International Hotel.

Frank Lyons, chief of F-5/T-38 Electronics Systems and AGE group, is vice chairman for West Coast activities in the 10,500-member, international AES group. He served as ex-officio member of the convention and was advisor to the Los Angeles section conference committee on technical aspects of the conference.

USAF Major Kenneth Cook was classified symposium director.

More than 1300 members registered for the classified sessions which were held in the Product Display building at Norair. Tom Tapper of Customer Relations coordinated arrangements for use of the Northrop facility.

## DAYS INTO SECONDS

Northrop engineers attending the AIAA's third Aerospace Sciences Meeting in New York discovered that eastern air travel can be as frustrating as western freeways. Especially if it's winter time.

Mickey Cahn of Norair, who combined a trip to Langley Research Center, Virginia, with the New York meeting, had his flight to Hampton snowed out, but made the trip by car. When he got ready to leave, even the roads were impassable. Two days later he finally got back to Baltimore to catch a plane for Los Angeles, but a blizzard struck there too.

Of significance at the meeting was a technical paper by Dr. S. S. Hu and M. L. Thompson of Northrop Space Laboratories' Huntsville facility which described a major advance in solving spacecraft guidance problems.

Dr. Hu, director of Research and Analysis section, compared the present method of calculating guidance parameters, which require months of planning in advance of a space flight.

"During the flight, guidance is controlled by a ground station — not by the astronaut. Often to calculate a change in the guidance parameters may take days or weeks, possibly months to complete," he said.



Mr. Lyons

"Our approach has enabled us to program the necessary change and receive a corrected answer in three seconds using an IBM 7094 computer."

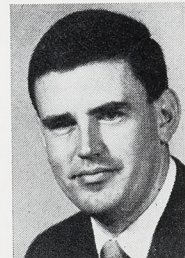
"This is a step toward using an onboard computer to solve guidance problems. Such a capability would allow the astronaut to fly his spacecraft rather than react to ground commands," Dr. Hu said.

Mr. Thompson, the paper's co-author, is engineer in charge of the computer programming unit at Huntsville.

## DR. PEPPER JOINS RESEARCH

Dr. Roger Thomas Pepper, a metallurgist who came to the United States from England in 1960, says that he didn't know when he crossed the Atlantic that he would have to contend with a lifetime of ribbing about his name.

But the good-natured authority on nuclear power and powder metallurgy, presently a principal investigator in the Materials Research group at Northrop Norair, has discovered that the ribbing soon subsides.



Dr. Pepper

Dr. Pepper joined the company last October and is responsible for research programs on intermetallic compounds and dispersion-strengthened metals.

Purpose of the studies is to develop new alloys with good strength in, for example, the temperature region of gas turbine operation.

Dr. Pepper received his doctorate in physical metallurgy from Manchester University in 1963. He came to Northrop from Minnesota Mining and Manufacturing Company, St. Paul, Minnesota. Prior to that he was a metallurgist for General Electric Company of England.

He was a research assistant and member of the academic staff at Manchester University for three years during which he worked on a program to develop a "fast" nuclear reactor fueled with uranium dioxide and cooled with sodium.

## AND IN CONCLUSION

Norm Laverty, associate chief — Engineering, at Nortronics Palos Verdes is a member of the review board and a technical session organizer for the 1966 Specialist Conference on Guidance and Control of the AIAA, now scheduled for August at the University of Washington.

J. P. Campbell of Norair's Electronics Systems Research group presented a paper on Infrared Signature and Suppression for F-5 Aircraft at the Fifth Meeting of IRIS Specialty Group on Infrared Countermeasures in Los Angeles, sponsored by the U.S. Naval Ordnance Test Station at China Lake.

## APOLLO

(Continued from page 4)

The Saturn booster and the Apollo launch escape system both contain a Nortronics-developed Q-ball sensor, a unique and highly accurate air data sensor that measures vital aerodynamic pressures relative to the ascent and descent of a vehicle.

In addition to measuring dynamic pressures, the Q-ball electrically totals its measurements and routes results to the command module for telemetering to the ground.

The Division's information and display system, Vigicon, will portray the flight graphically at control centers at Kennedy Space Center and Goddard Space Flight Center, Green Belt, Maryland.

A new star-tracking system capable of providing highly accurate celestial fixes to shipboard navigation systems is being produced by Nortronics Marine Equipment Department, Needham Heights, Massachusetts, for use in the Apollo program. A star sensor for the system is being provided by the Division's Palos Verdes research facility.

And, finally, the Division's Precision Products Department at Norwood, Massachusetts, is providing gyroscopes for both the first and second stages of the Saturn 1B.

# CASA: Spanish Program Picks Up Tempo

(Continued from page 2)

Mr. Omley said.

Mr. Omley noted that the scope of the program includes each necessary element from technical data through production.

Interchangeability is an oft-heard phrase associated with the Spanish program.

It means, simply, that CASA-made parts for the F-5 will fit not only Spanish Air Force aircraft, but also those aircraft built at Norair for other allied nations.

Maintaining this feature is anything but simple.

First, Northrop Norair must provide CASA with technical data that is exact to the smallest detail and it must update this material whenever changes are made. Toward this end, there are now 74 volumes of information covering such subjects as design engineering, control of engineering changes and configuration management.

There is a great number of other volumes of general reference material, including 14 which cover various types of required aircraft records alone. Copies of Improved Data Exchange

Master Files, to be provided, list more than 40,000 items. In addition, copies of more than 100 technical manuals will be furnished.

In augmenting technical data, Norair is providing master tools from which CASA will make its own production tools to ensure interchangeability.

Current Norair tool fabricating activities are centered around 20 international tooling masters that ensure proper controls over major mating points (wing-to-fuselage, flap-to-wing); 215 secondary masters to ensure interchangeability of even the smallest components; 100 plaster mockups or laminated transfers to control external airframe surfaces; and 26 bonding fixtures.

Carrying out still another major part of the program at the request of CASA, Norair has selected a 24-member Technical Assistance Team, a sort of miniature company made up of specialists in a wide range of fields—tooling, production, data processing, engineering and materiel to name a few.

Team members will spend varying

periods of time in Spain, depending upon their assignments.

To head this all-important activity, Norair management selected as its director John Breneman, a 25-year Northrop veteran with extensive background in every phase of production.

Mr. Breneman and Norair management have hand-picked the remaining 23 members from long lists of applicants. Those selected are veteran employees, versatile, knowledgeable and equipped to do many jobs under any condition.

"I feel this Team is exceptional in many respects and highly capable of representing the Northrop image in Spain," Mr. Breneman said.

Some Team members speak Spanish fluently while others have worked Spanish language training into their busy pre-departure schedules. Each has also taken time to study the customs of Spain, its people and traditions.

In Spain CASA operates two major facilities, one at Getafe, near Madrid, the other at Seville, some 300 miles away. Both facilities are modern, well-equipped and staffed with experienced technicians, engineers and management personnel.



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

**For Sale**  
Lot, R-1. Thunderbird Country Club area, Palm Springs, 1/2 dn., \$6000. L.A., 472-2722.  
**Chevrolet Impala** sport coupe, 1959, Hydramatic, p/s, p/b, r/h, \$625. Inglewood, OR 2-4247.  
**Organ**, Conn Caprice, \$600. Torrance, FR 8-1350.  
**Tape Recorder**, w/2 microphones, & 1 roll new tape, stereo or mono., record & play-back. 7 1/2 & 3 3/4 spd. meter for voice level on channels, \$185. Buena Pk., LA 1-4711.  
**Chevrolet**, 1957 4-dr., r/h, auto. trans., low mileage, \$325. Compton, 632-3523.  
**TV**, Packard Bell, 19", Danish walnut console convlt. to portable, \$75. Costa Mesa, 714-545-5341.  
**Hudson**, 1 50, \$150. Lawndale, FR 9-4782.  
**Tires**, mostly 8-20 x 15, some w/s/w, \$2 ea. L.A., 472-3374.  
**Mirror**, plate glass, 26 x 44, \$5. Torrance, DA 3-8797.  
**Bicycle**, girl's 26", \$20. Harbor City, 326-1409.  
**House**, 4-bdrm., family rm., built-ins, fireplace, landscaped, sprinklers, 10 min. to Northrop, \$32,950. Torrance, 327-2666.  
**Organ**, Hammond elec., dark walnut, \$300. Torrance, 370-6858.  
**Wheels & knockoff** hub caps, 4 chrome, for 1965 Chevrolet, \$40. Compton, DA 9-6848.  
**Chevrolet Malibu SS** coupe, 1964, 4-barrel, console, r/h, p/s, p/b, \$2170 or take over approx. \$88 mo. pymnts. Anaheim, 635-1685.  
**Honda**, 1965, 250 cc Scrambler, less than 3500 miles, 9-mos.-old, \$550. Box 301.  
**Bedroom Furniture**, dble, bed w/utility head-board & matching 5-dwr. chest, modern, light wood, box spring & innerspring mattress, \$95. L.A., 645-7931.  
**Home**, 3-bdrm., 2-bath, fireplace, built-in dishwasher & stove, newly redecorated, \$27,500. Torrance, DA 9-6885.  
**Language Records, Spanish**, 4 12" LP records, 40 lessons w/instructions, \$4. Torrance, 323-1698.  
**House**, 2-bdrm, panelled l/r & d/r, lge. kitchen, recently painted, patio, fenced yard, 5 min. to Norair, \$19,000. Hawthorne, 676-6930.  
**Desk**, modern, dk. blonde, cost \$138, \$75. Hawthorne, OS 9-2337.  
**Motor Scooter**, Cushman Husky, w/side car, new tires, \$75. Lawndale, 370-3230.  
**Folk Guitar**, nylon strings, \$25. P.V. Estd., 377-3548.  
**Ping Pong Table**, 5 x 9', 3/4" plywood, \$10. Lawndale, OS 9-0876.  
**Farm Tractor**, International, rebuilt eng. 72 hrs. running time, \$300. Compton, 321-9557.  
**Own-Your-Own Apt.**, 1-bdrm., lge. glassed in lanai, built-ins, patio, heated pool, gar. w/ storage rm., ample guest parking, FHA 4 1/2% mortgage, pymnts. \$99 mo. incl. maintenance & replacements, low down, \$15,000. Hollywood, 467-9201, 465-5314.  
**NSU Prinz sedan**, 1959, \$175. Hawthorne, 675-4505.  
**Pickup** & teardrop camper, Dodge, 1/2-ton, 1961, r/h, auto. trans., dual battery sys., new 6-ply tires, intercomm, V-8 eng., camper is 8' non-cabover, many custom extras, \$1495. Torrance, 371-8701.  
**Shotgun**, 12-ga. High Standard, pump action, Flite King field model, full choke, \$60. Hawthorne, OS 9-5874.  
**Acreage**, 2 1/2 acres, Antelope Valley, \$15 down & \$15 mo., \$1500. Torrance, FR 8-1026.  
**VW**, 1964 sedan, new tires, battery, brakes, & plugs, \$1395. Downey, TO 9-2700.  
**Chevrolet**, 1955, 327, 4-spd., 4.56, slicks, T-bars, new paint & int., \$1050. P.V. Estd., 746-9376, 375-9747.  
**Ford**, 1957, 2-dr. Fairlane 500, p/b, p/s, new tires, \$300. Torrance, 320-5552.  
**Skindiving Equipment**, aqua lung regulator, 2 wet suits, fins, masks, weight belts, \$75. Manhattan Bch., FR 9-3003.  
**Renault**, 1959 4cv, 5-new tires, new brakes, cylinders, starter, & fuel pump, 200 miles on eng., \$195. Montebello, 724-4300.  
**Plymouth**, 1957 4-dr. Savoy, good tires, newly o/hauled, new paint, \$300. Yorba Linda, 524-0857.  
**Mustang**, 1965, 2-dr. h/top, V-8, 225 hp Cruise-o-matic, factory air cond., console, r/h, \$2495. Torrance, 371-5229.  
**Chevrolet Super Sport**, 1964, convt., V-8 327 cu. in. 4-spd., r/h, Astro chrome wheels, \$2200. LaHabra, 213-691-0106.  
**Studebaker** station wagon, 1957, \$200. Hawthorne, 679-6581.  
**Volkswagen sedan**, 1965, 11,500 miles, \$1750. Garden Grove, 714-530-1237.  
**Rifle**, Armalite aircraft survival .22 cal. semi-auto, demountable, \$30. Torrance, DA 6-7232.  
**Cabin Cruiser**, 1962 23' Trojan, 185 hp in-board V Interceptor eng., sleeps 4, incl. stove, sink, elec. bilge blower, ship-to-shore radio, \$3600. L.A., RI 8-0208, GR 4-0812.  
**Cadillac** sedan Deville, 1956, full power & air, \$400. Stanton, JA 7-5337, OS 5-3643.  
**Corvette**, 1960 h/top, r/h, 4-spd., fuel injection, positraction, h.o. clutch, chrome wheels, \$1595. Pacific Palisades, GL 4-7232, GL 4-3931.

**For Sale**  
**Buick**, 1956, r/h, w/s/w, \$130. Torrance, 328-9049.  
**Youth Bed**, Baby line, \$20. Hawthorne, OS 6-1673.  
**Chevrolet Biscayne**, 1961, 6-cyl., auto. trans., r/h, \$650. Inglewood, 678-1621.  
**Morgan**, 1960, alum. body, Nardi wheel, comp. exhaust, r/h, \$1295. Santa Ana, 714-LI 4-6135.  
**Chevrolet Impala**, 1959, 4-dr., 8-cyl., auto. trans., r/h, \$500. L.A., 294-5998.  
**Hollywood Bed**, single, w/new turquoise & green custom coverlet & bolsters, \$70. L.A., 656-0201.  
**House**, 2-bdrm., lge. lot, dble. detached gar., new carpeting & linoleum, GI loan, \$23,950. Manhattan Bch., FR 6-6848.  
**Cabin Cruiser**, 19 1/2', Glasspar club mariner, Volvo 1/0 w/trailer, \$3795. Hermosa Bch., 374-7290.  
**Organ**, Hammond model B-3 w/HR-40 tone cabinet, blond, \$1800. P. V. Pen., 377-5415.  
**Stove**, Westinghouse elec., clock-timer, 40" oven w/glass window, \$45. Huntington Bch., 897-8201.  
**Drafting Machine**, Universal Boardmaster, 30" arms, new model w/little use, \$75. Redondo Bch., FR 6-6415.  
**Sailboat**, sloop rigged, fiberglass hull, centerboard, Romeo class, 13', cartop carrying rig, dacron sails, access., \$375. Torrance, FR 4-4953.  
**Chevrolet**, 1953 convt., std. trans., good top & tonneau cover, new shocks & front springs, \$195. Torrance, 327-4585.  
**Chrysler 300**, 1962, 42,000 miles, new brakes & tires, p/s, p/b, 6-way p/bucket seats, radio, \$1800. Fullerton, 526-4168.  
**Chrysler**, 1957, h/top, full power, new paint, battery, brakes, smog device, \$295. L. A., RI 8-5864.  
**Camera**, Fotron, completely auto. electronic brain, mag. load, built-in flash, leather carrying case, film, \$50 & take over pymnts. or \$300. Hawthorne, 328-3749.  
**Volkswagen**, 1964, 1500 S sedan, 19,600 miles, \$1750. Lynwood, 638-9954.  
**Golf Equipment**, custom-made Stan Thompson woods set of 4, black leather head covers, lge. black golf bag & cart, \$45. Gardena, DA 9-3436.  
**Bed**, dble., box spring, mattress, bookcase headboard & matching dresser, antique grey, \$50. Inglewood, OR 2-8468.  
**Pickup Truck**, 1946, \$100. Gardena, 329-9484.  
**Osterizer**, 3-spd. pushbutton, delux model, \$30. Hawthorne, 644-3229.  
**Baby Crib & mattress**, dble. drop sides, \$15. Long Beach, HA 1-6958.  
**Oldsmobile 98**, 1956, convt., \$150. Torrance, TE 5-6221.  
**Volkswagen**, 1960, low mileage, \$800. Hawthorne, 679-7662.  
**Ford Station Wagon**, 1957, 2-dr. ranch wagon, 245 hp V-8, r/h, trailer hitch, orig. owner, \$245. Rolling Hills Estd., FR 8-5175.  
**Chevrolet**, Parkwood station wagon, r/h, Powerglide, \$565. P. V., FR 5-0867.  
**Air Conditioner**, Mark IV, for 1960 Chevrolet station wagon or equiv., brackets & 9-blade thermo-fan, \$150. Placentia, 528-5006.  
**Corvette**, 1950, 230 hp, 3-spd. trans., 1 owner, \$1350. Manhattan Bch., 379-3477.  
**Chevrolet SS**, 1963, 409 w 400 hp, 4-spd. 19,000 act. miles, \$1300. L. A., 757-5455.  
**Sailboat**, 16' skimmer class sloop, 2 sets sails, hull glassed, 3 rudders, trailer, many extras, repainted, \$750. Garden Grove, 714-539-2098.  
**Chevrolet**, 1958, 4-dr., stick shift, \$400. Long Beach, GA 2-4740.  
**Battery Charger** for car or boat, 6-8-12 volts, \$4. Hawthorne, 676-0418.  
**Ford Galaxie 500**, spec. 406 new eng. & access., tri-carb, positrac, 4-spd. trans., 2-dr. h/top, \$1800. Inglewood, OR 7-7355.  
**Drawing Table**, commercial artist-type, cast iron center stand, tilts & raises, \$20. Gardena, DA 3-3202.  
**Fiberglass Panels**, corrugated green, 6 26"x 8", 6 26"x6", 2 34"x6", 2 34"x8"; train eng., HO elec.; baby bed & springs, \$65. Hawthorne, OS 5-1860.  
**Wheel Chair**, folding, Everest Jennings, \$75. Torrance, DA 5-5245.  
**MG TD**, 1952, \$350. Lawndale, 675-7958.  
**Sewing Machine**, Montgomery Ward, portable, used very little, \$25. Long Bch., GA 3-1363.  
**Bicycle**, boy's 26" Schwinn, \$13. Torrance, FA 8-3306.  
**Volkswagen**, 1963, full sunroof, \$1150. Long Beach, 596-1280.  
**Chevrolet Nomad** Station Wagon, 1958, p/s, p/b, r/h, new trans., big eng., \$425. P. V. Pen., 377-7241.  
**Motorcycle**, 1961, 250 cc Royal Enfield Scrambler, set up for dirt, good tires, extra gearing, \$250. Long Bch., HA 5-5198.  
**Sailboat**, Cal 20 #287, w/trailer & motor, many extras, \$4000. Torrance, FR 5-9775, 325-2613.  
**Chevrolet**, 1958, 2-dr., 348 cu. in. eng., 3-spd. trans., Hearst floor shift, \$400. P. V. Pen., FR 7-5439.

**For Sale**  
**Rambler** station wagon, 1960, r/h, air condition, 6-cyl., \$350. Torrance, 835-3985.  
**Snow Tires**, Town & Country Firestone, 7.75x14, 4-ply rating, \$40. Lawndale, 371-6775.  
**Chevelle El Camino**, 1964, 4-spd., bucket seats, r/h, p/b, \$1800. Hawthorne, OS 6-3169.  
**Furniture**, end tables, kitchenette set, rugs different sizes, curtains, \$30. Manhattan Bch., 379-6762.  
**T-Bird**, 1956, h/top, recent o/haul, paint & tires, auto., orig. owner, \$1275. Pacific Palisades, 454-2057.  
**DeSoto**, 1959, auto., p/s, p/b, radio, new tires, points & plugs, \$150. Lomita, 325-8566.  
**Volkswagen**, 1965, radio, seat belts, sunroof, low mileage, \$1650. Long Bch., 633-5938.  
**Exec. Home**, 4-bdrm., family rm., prof. landscaping compl. w/full water sprinklers, covered 16 x 24 patio, central air cond., block wall fencing, \$32,500. Anaheim, 714-630-2662.  
**Renault Dauphine**, 1961, new tires, radio, \$350. P. V. Pen., 377-4489.  
**House**, 2-bdrm., paneled den, lrg. kitchen, newly decorated, 10 min. from Northrop, \$25,000. Inglewood, 751-7367.  
**Camera**, 4x5, Crown Graphic, power flash meter sp, plates, flash gun, case, \$275. Inglewood, 677-6348.  
**Pickup**, Chevrolet, 1963, 3/4-ton, r/h, auto., V-8 eng., hvy. duty, equipped for camper, air-cond., many other extras, \$1575. San Pedro, 833-8286.  
**T-Bird**, 1962, r/h, all power, good tires, \$1550. Inglewood, 677-0743.  
**Coat**, woman's Naugahyde, w/belt, pink, size 14, cost \$37, \$25. Hawthorne, OS 6-7082.  
**Bicycle**, girl's, 24", balloon tires, needs cleaning, \$10. Los Alamitos, 430-1245.  
**T-Bird**, 1957, orig. owner, 47,000 miles, \$1700. San Pedro, TE 2-1684.  
**Encyclopedia Americana**, 30 vols. plus min/max teaching machine w/varied selection of courses, \$299.50. Lawndale, 370-3230.  
**House**, 2-bdrm., dining rm., fireplace, dble. garage, \$21,750. Inglewood, OR 1-3860.  
**Sailboat**, lightning class, #5690, incl. trailer, sprinkler & all access., \$950. Manhattan Bch., 379-6572.  
**Corvaair**, 1961, Lakewood station wagon, auto., r/h, \$695. Venice, EX 1-2040.  
**Mustang**, 1965, convt., 11,000 miles, white p/top, 289-4V-V-8 eng., Cruise-O-Matic, p/s, disc brakes, w/s/w, r/h, console, \$2690. Costa Mesa, 714-KI 9-2646.  
**Ford**, 1959, air cond., \$425. L.A., 474-3433.  
**Bicycle**, boy's, 10-spd. Derailleur, Puch-Burgmeister, new spokes, tubes, gears reworked, \$40. L.A., 645-3019.  
**Mangle Ironer**, Kenmore, \$35. Harbor City, 325-5705.  
**Vacuum Cleaner**, Kirby, all attachments, floor polisher & waxer, never used, \$75. Hawthorne, OS 5-2772.  
**Trailer Hitch**, custom built for 1960 Pontiac station wagon, bolts to frame, hvy. duty, \$7. P. V. Pen., 377-4585.  
**Stove**, gas, \$15. Inglewood, 672-7227.

**Wanted to Buy**  
**Stove**, copperstone, gas, reasonable. Inglewood, 672-6754.  
**Trailer**, 2-wheel utility-type, 4'x8', good condition. Harbor City, 325-0221.  
**Radio Equipment**, Motorola, GE or RCA units for use on 2 meters, unconvtd. 150 to 170 mc, mobiles &/or base stations acceptable. Whittier, OX 3-4117.  
**Vacuum Cleaner**, used, upright, reasonable. P. V. Pen., 377-2101.  
**Student Desk**, chair, bookcase; any one or all three. Manhattan Bch., 379-1163.  
**Radio Receiver** capable of receiving 156 m.c. Redondo Bch., 370-7749.  
**For Trade**  
**Bicycle**, girl's 28", Sears J. C. Higgins, about \$15 value, trade for 20" or 24", girl's. Hawthorne, 676-4251.  
**Baby Furniture**, all or part; crib, high chair, training chair, jumping chair, trade for 8 mm motion picture camera or projector of equivalent value & condition. Age need not be equivalent. Hermosa Bch., 379-1542.  
**FREE (To Be Given Away)**  
**Pups**, small German shepherd, all black, females, 6-wks-old. Monterey Pk., PA 8-4606.  
**Rentals Offered**  
**House**, 3-bdrm., 1 1/2 bath, built-ins, dble. garage, 1 mile from ocean, lease/option, \$140 mo. Redondo Bch., 374-2433.  
**Duplex**, front, unfurn., 2 lge. bdrms., gar., water & lawn pd., near shopping, 5 min. to Norair, \$100 mo. L.A. PL 4-1964.  
**Bachelor Apt.**, utilities pd., 2 blocks from Norair, \$90 mo. Hawthorne, OS 6-7417.  
**Bachelor Apt.**, furn., utilities pd., nice yard, \$45 mo. Hawthorne, 754-9866.  
**House**, 4-bdrm., 1 1/4 bath, large kitchen & parlor, forced air heat, children OK, \$150 mo. Lawndale, OS 6-0586.  
**Apt.**, 2-bdrm., modern, pullman bath, built-in cabinets & oven range, thermo heat, gar. & child's play area, 2 children OK, \$100 mo. Torrance, 320-2827.  
**Apt.**, 2-bdrm., unfurn., built-ins, fenced in backyard, 15 min. to Northrop, \$110. Lennox, OR 1-6734.  
**Apt.**, deluxe 2 or 3 bdrm., \$135 mo. Torrance, 325-1056.  
**Apt.**, 2-bdrm., unfurn., gar., across from high school, 10 min. from Norair, \$95 mo. San Pedro, 831-6789.  
**Apt.**, 1 bdrm., furn., encl. gar., 1 block to beach, \$105 mo. Manhattan Bch., 379-7701.  
**Apt.**, 3-bdrm., 1 1/2 bath, built-ins, pvt. gar. & sundeck, near Northrop, children OK, \$150. Hawthorne, OS 5-7938.  
**Apt.**, 2-bdrm., furn., lge. pool, closed gar. & storage, near El Camino, \$135. Torrance, DA 9-5986.  
**Apt.**, 3-bdrm., unfurn., 2 lge. baths, serv. porch, patio, family rm., fireplace, dishwasher, intrcom. f.a. heat, built-in units, near Norair, \$180 mo. Hawthorne, 679-1358.  
**Apt.**, 1-bdrm., 3 blocks from Northrop, unfurn., except for stove & refrig., colored tile bathroom, parking for 2 cars, \$85. Hawthorne, OS 6-4734.

Going my way?

**Rides Wanted**  
**7 a.m. — 3:45 p.m.**  
**Sepulveda & Hawthorne Blvd.**, Torrance. Pauline Doyle, Norair, ext. 2605, 325-7553. 2  
**7:30 a.m. — 4:15 p.m.**  
**Fallbrook Ave. & Ventura Blvd.**, Canoga Park. Veronica Stockard, Norair, exts. 1480, 1814, 347-4200. 3  
**Crenshaw or Van Ness & Artesia**, Torrance. Elaine Gagnon, Mariposa, ext. 4265, 323-0826. 3  
**Hermosa Ave. & 25th St.**, Hermosa Bch. Penny Prouty, Norair, ext. 1458, OS 9-6520.  
**Coldwater & Chandler Blvd.**, No. Hollywood. E. R. Knott, Norair, ext. 2324, 761-9645. 3  
**8 a.m. — 4:45 p.m.**  
**Yale St. & Broadway**, Santa Monica. Arnold Weinstock, Norair, ext. 1758, EX 3-9047. 5  
**Orange Ave. & Del Amo**, Long Beach. W. H. Covert, Norair, ext. 2721, GA 3-1363. 5  
**Rides Offered**  
**7:30 a.m. — 4:15 p.m.**  
**Fallbrook Ave. & Ventura Blvd.**, Canoga Park. Veronica Stockard, Norair, exts. 1480, 1814, 347-4200. 13  
**Coldwater & Chandler Blvd.**, No. Hollywood. E. R. Knott, Norair, ext. 2324, 761-9645. 13  
**8 a.m. — 4:45 p.m.**  
**Yale St. & Broadway**, Santa Monica. Arnold Weinstock, Norair, ext. 1758, EX 3-9047. 15  
**Orange Ave. & Del Amo**, Long Beach. W. H. Covert, Norair, ext. 2721, GA 3-1363. 15  
**Rentals Offered**  
**Apt.**, deluxe, lge. 2-bdrm., unfurn., 1/2 blk. from ocean, beam ceilings, built-ins, gar., avail. after Feb. 23rd., \$150 mo. Manhattan Bch., FR 9-9996. E  
**Rentals Wanted**  
**House**, 2-bdrm., unfurn., in Hawthorne area, approx. \$90 mo. Compton, 639-1875. F  
**Personals**  
**Secretary** wishing to share apt., 2-bdrm., built-ins, patio, close to Northrop. Inglewood, OR 1-5242. L  
**Flying Bonanza** to Ohio & Boston, March 25-April 12, would like 1-way or roundtrip passengers to help w/expenses. Hawthorne, 679-7563. L  
**Flying Club** has opening for student pilot. L.A., 293-0213. L  
**For Sale or Trade**  
**Truck & Camper**, 1965, Datsun, step bumper, radio, 8000 miles, \$1450 or trade for late model camping trailer. South Gate, 714-529-1790. M  
**VW Camper**, 1962, 28,000 miles, Westphalia model, top rack, 2 fitted tents, \$1850 or trade for VW sedan. Gardena, 329-2904. M  
**Camper**, 8 1/2' 1/2 cabover, cost \$1375, \$900 or trade for travel trailer of like value. Gardena, DA 4-1593. M  
**Plymouth Belvedere**, 1957, r/h, good tires, \$100 or trade for used Honda 50. Inglewood, 679-4237. M  
**Camper**, Pilgrim, 1965 model, fits any 8' fleet side pickup truck, \$695, or trade on 18' to 20' self-contained trailer. Gardena, DA 4-7623. M  
**Sailboat**, 15' Sunray, w/trailer, \$200 or trade for motorcycle or guns. Torrance, DA 3-2144. M

FRINGE BENEFITS

(Continued from page 2)

tion it can on the situation. It then reaches a decision and notifies all concerned.

It sounds as if we are getting a little repetitious but let's assume that the employee is still not satisfied with the decision made. He can then go to arbitration, which means in substance that the employee and the company select an outsider from a list of recognized arbitrators furnished by the Government who then hears the case.

All of this sounds pretty complicated but it really is not. Each step must fall within a prescribed time limit so that things move along rapidly. Industrial Relations people are always ready to help the employee in any stage of the proceeding in preparing his documents, lining up his witnesses, et cetera. The employee may have a fellow employee or a lawyer represent him if he so desires. In short, everything is done to ensure that every individual employee's rights are fully protected and upheld.

In conclusion, let me tell you of a recent experience. An ex-employee was talking with me a few weeks ago. He said that he was sorry that he was no longer working at Northrop but that he felt that he had been laid off improperly several years back and was still disturbed about it. When I asked him why he didn't file a grievance, he said that he had been too upset. He did not say so, but perhaps he felt as some people do, that probably the company would back up its

supervisor anyway and that even if he won the supervisor would hold a grudge against him forever.

This gentleman was obviously a fine man who would have continued to be a credit to the company. Certainly he didn't have to file a grievance, but the company would like to have people in this kind of a situation do so.

He needn't have had the slightest fear about getting a fair hearing because company management knows that its supervisors can make mistakes and that when mistakes are made they should be corrected. He need have had no concern about his supervisor holding a grudge because the right kind of supervisor is anxious to do the right thing and recognizes his mistakes when they are pointed out to him. Even if the gentleman had been found to be wrong about the layoff, he would have had his hearing and would have avoided years of unrest.

If there is a moral to be read from this story, it is that the company can't know about the individual's problems unless the individual makes them known. The Northrop grievance procedure is there for the employee to use. We hope that he will read it carefully and that he will use it. He will thus be assured of the person-to-person relationship with his management which is so necessary in ensuring that each of us is recognized and treated as an individual.



## KEN MAH BECOMES WISE OWLS' FIRST VENTURA INDUCTEE

Kenneth Mah has become the first Wise Owl at Northrop Ventura since the inception of the eye protection program in 1964.

Mr. Mah is enrolled as a life member of the Wise Owl Club at Northrop Ventura. This is a national organization which is sponsored by the National Society for the Prevention of Blindness, Inc.

The certificate of membership was presented on December 15 by Earl Clark, chairman of the Supervisors' Safety Committee. The certificate reads:

"Kenneth Mah is enrolled as a life member of the Wise Owl Club of Northrop Ventura and is acclaimed for his judgment and foresight in the conscientious use of the eye protection which has saved his vision in a work accident."

Ken came to work one morning in the Plastics shop expecting a routine day. The fact that he put his safety glasses on and wore them all day proved to be one of the most important things he ever did in his life.

Later, using a drill motor, a chuck key which was not disengaged was ejected like a projectile toward his left eye. A split second later he felt the impact as the left lens of his safety glasses shattered. There was no injury but it could have been a disastrous event.

"Habit had dictated that he put on his safety glasses before starting the job each day. When he needed them most, he had them where they should be—not in his pocket or his tool box, but over his eyes," Mr. Clark said.

"Good safety habits are solid insurance in cases such as this when the unexpected occurs. Wearing eye protection all the time in the plant will prepare for the unplanned event that could rob a man of his precious sight."

## 30 Explorers Learn About Stock Market

Explorers in Ventura County's first special interest post, sponsored by Northrop Ventura, learned something of the ins and outs of the business world during their last two meetings.

With Walter F. Sternadel, treasurer, and Les Hudson, director of Contract Accounting, 30 of the Explorers visited a stock exchange and a major brokerage firm on Los Angeles' Spring Street.

Their next meeting brought them inside the Ventura Division where Tom Flannigan, manager of Marketing, and Jim Brochu, director of Production Programs, introduced them to some inside aspects of business.

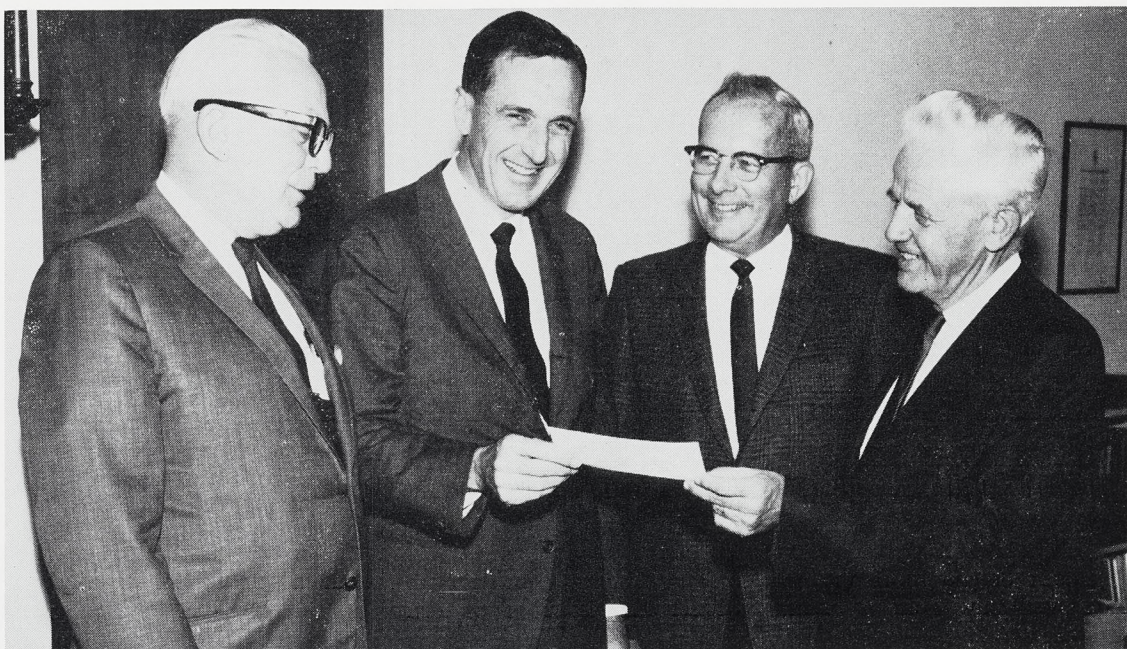
Because of a major outbreak of flu at Thousand Oaks High school, affecting some 650 students, about half of the post membership attended the second event.

During the visit to Newbury Park, the post heard Mr. Flannigan describe the functions of marketing and planning. Mr. Brochu described the complexities of aeronautical systems.

Motion pictures helped the high school students understand the background and present work of Ventura, how and why drones are utilized, and some new concepts in paradynamics.

Bart Cook is coordinator of the Explorer post and Don Archer advisor on behalf of Northrop Ventura.

## \$1000 GIFT TO HIGHER EDUCATION



Another annual gift to California Lutheran College in Thousand Oaks, check for \$1000, is presented to Dr. Raymond M. Olson (right) by George C. Grogan, vice president and manager, Technical department of Northrop Ventura. Participants in ceremony were John Nordberg, left, director of church, public and alumni relations; and Chester Shamel, director of college development. Amount was designated by Northrop Corporation University Relations Advisory Board.

Participants in ceremony were John Nordberg, left, director of church, public and alumni relations; and Chester Shamel, director of college development. Amount was designated by Northrop Corporation University Relations Advisory Board.

## PENNS ON THE MOVE

### The Family That Retires Together...

Northrop Corporation's first couple to retire simultaneously, Gilbert and Edith Penn, have entered the "good life" after being feted to a rousing farewell party by their Northrop Norair friends.

This pre-Christmas affair drew some 100 well-wishers to the Northrop Norair cafeteria December 22. In addition to personal "bon voyage" wishes, those taking part presented the Penns with evidence of their affection in the form of about \$100 to help them enjoy their new leisure. Adding to the festivities was a huge cake appropriately bedecked with boat, trailer, fishing scenes

and the like, in keeping with the plans the couple have in mind.

Edith Penn worked for Northrop from 1943 to 1951, then left for a brief period, returning the same year. Since 1951 she has served as an Automated Operations Control operator in Production Control department.

Gil Penn also joined Norair in 1951 and worked as a fork lift operator in Maintenance before shifting five years ago to Transportation. He has operated every type of in-plant vehicle since then and more recently served as a dispatcher.

The Penns acquired a mobile

home and plan to reside in the Hemet area "between trips." That is, they also own a pickup truck and camper unit in which they hope to fulfill a lifetime dream of "just going."

"Next spring we'll go into the northeastern part of the country, then on up into Canada," Mr. Penn said. "After that, who knows?"

(Editor's note: Northrop Nortronics also has at least one retired couple, Clarence and Tillie Hawken. However, Mr. Hawken entered retirement in 1956, while Mrs. Hawken worked until 1964 before retiring.)

## Automation Has New Voice On Luxury Ship Sagafjord

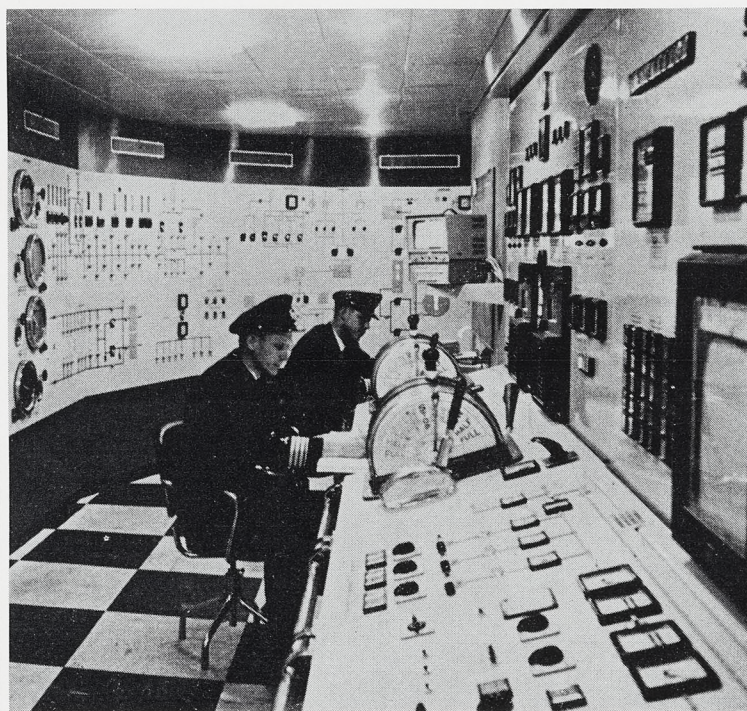
Norwegian America Line's new 21,500-ton cruise liner Sagafjord, the first ocean vessel to use an automatic voice warning system to alert crewmen of malfunctions or out-of-tolerance conditions, has completed her maiden voyage from Oslo to New York.

Developed and manufactured by Northrop Nortronics, the voice warning system (VWS) has been integrated into one of the most extensively automated passenger ships afloat.

Aboard the Sagafjord, VWS keeps tabs on 50 critical parameters of ship performance and automatically issues recorded verbal messages, on a priority basis, to identify problems which may arise.

The system eliminates the possibility that a warning light, buzzer or faulty gauge reading will go undetected by a crewman working in the ship's active control center. When an out-of-tolerance condition occurs, the Northrop VWS plays its message in a crisp, easily comprehensible voice until the problem is corrected.

If multiple malfunctions occur simultaneously, the system programs the more urgent warning first. It will interrupt any message should a malfunction of higher priority occur, while storing for later playback the less urgent messages.



Clean, quiet and efficient is automated control room of luxury ship Sagafjord, which includes Nortronics Voice Warning System.

Tests have indicated that the time involved in recognizing, comprehending and reacting to a malfunction is reduced by half when a Northrop VWS is used instead of conventional warnings.

"Such a decrease in the time required to react properly to a problem can mean the difference between an easily corrected malfunction and one which could escalate to a catastrophic failure,"

according to Al Vogel, chief of the Weapons Status Reporting Equipment group at Palos Verdes.

And, according to the Norwegian America Line, "automation has eliminated the need for old fashioned klaxon alarms and has curtailed necessity for shouted commands. The nerve center is quiet, orderly and efficient — a far cry from engine rooms familiar to men who have spent

## CONACO FOCUSES ON FLARE KIT IN SECOND HALF

CONACO, the Northrop Ventura-sponsored Junior Achievement company, swung into action the second half of their fiscal year with an emergency flare kit as their product.

The group produced Christmas wreaths in addition to the kits during the first half of the 1965-66 season.

CONACO was represented recently at the 11th annual JA Sales Convention at Los Angeles Trade Technical College. In attendance were Lynn Aldrich, vice president, Sales; Gail Wolf, promotion manager; Mike Finch, Personnel director, and Cheryl Polen.

Douglas Finch, sales advisor, and Walter Knox, management advisor, attended on behalf of Northrop Ventura.

Other CONACO officers include Tom Wild, president; Ronaele Craig, secretary; Jamie Sturm, treasurer, and Dennis Zachery, vice president, Manufacturing.

## County Junior Miss Scores in Pageant

Janet Lynn Carroll, Ventura County Junior Miss, met with threefold success in the California Junior Miss Pageant.

The daughter of Laurence B. Carroll Jr., director of Production and Production Engineering at Northrop Ventura, was selected a finalist among 10, took the scholarship title competing with 19 other top feminine students, and won the Junior Miss-Breck award for her essay on what beauty means to her.

Janet was sponsored in the state pageant by the Ventura Junior Chamber of Commerce, which staged the county-wide Junior Miss contest in January.

their lives at sea."

In the 79-foot control room of the Sagafjord, the chief engineer sits at a desk facing a master panel fitted with nearly 200 instruments.

There's a galaxy of colored lights, dials, switches and buttons that guard performance of major equipment and also provide a means to apply corrective measures.

With so many instruments and lights on a control panel, there is a danger of "visual loading", a condition that can slow the engineer's reaction to an emergency.

With the voice warning system, he knows immediately what is wrong and where, rather than having to continuously survey the complete control panel to isolate a malfunction.

Typical of VWS recorded messages which the Sagafjord chief engineer might hear are:

"High temperature at bearings of main engine, port side."

"Lube oil low pressure, main engine, starboard side."

"Cylinder water pressure low, main engine, port side."

The system was originally developed by Nortronics for use on U.S. Air Force B-58 bombers. A similar system is used to monitor operational readiness of Minuteman intercontinental ballistic missiles.



## COUPLES EVENTS COMING UP AT ANAHEIM NRC

A couple of events catering to couples are in the works at Nortronics Anaheim as new Northrop Recreation Club officers begin planning for another year of recreational activities.

A Scotch Doubles bowling tournament March 20 and an NRC-sponsored dance February 26 highlight present efforts.

Bowlers will gather at Carter Bowl, Fullerton, for the second annual NRC Scotch Doubles event. Squad times will be noon, 2 and 4 p.m. The entry fee is \$6 per couple for six lines. Entries must be made by March 15 with Personnel Activities, NRC Commissioner Chet Guzinski reports.

The February 26 dance will be held at the NRC Clubhouse, Anaheim, and features the music of Gene Galante and the Tune Launchers. Refreshments will be available. The cost is \$1.50 per person and ticket sales will be limited to 150 persons, the capacity of the house. No tickets will be sold at the door. Personnel Activities and the following individuals, Larry Anderson, Bob Benedict, Orville Mitchell, Dorothy Peringer and Randy Lee, have tickets for sale.

## Shutterbugs View Auto Racing Film

Northrop Camera Club members will be feted to a special movie on auto slalom racing at 7:30 p.m., February 22 at a meeting set for NRC Clubhouse, Hawthorne.

Bill Spring, NRC Sports Car Club commissioner, has arranged the film showing, according to Commissioner Lauren Ray.

Members are also asked to bring six slides or prints for a discussion period to follow.

## Rancho San Joaquin Site for Tournament

Two days remain in which Northrop Nortronics golfers may enter a February 26 golf tournament set for the Rancho San Joaquin course, NRC Commissioner Dick Clarke reports.

Starting times begin at 11 a.m. and the total cost is \$6 for this medal play event with full handicap. Contact Personnel Activities, Mr. Clarke at ext. 329 or Bob Benedict at ext. 1187 (both Anaheim) to enter.

## PREMIER GETS FEEL OF F-5



South Vietnam's Premier Nguyen Cao Ky settles into the cockpit of a Northrop F-5, one of a squadron which arrived in the Southeast Asia theatre last November for combat. U.S. Air Force Colonel Frank Emory, commander of the Skoshi Tiger squadron, describes simplicity of design and handling, which makes F-5 a "pilot's airplane." At left is Lt. General Joe Moore, commander of 2d Air Division.

## CONTRACT: Computer, Inertial Platform Technologies Converge

(Continued from page 1)

have included a pre-launch computer for the Skybolt program and a series of integrated circuit devices designated NDC 1000, NDC 1050 and 1050A and the latest development, the NDC 1051.

The beginnings of inertial platform technology initiated under the Snark guidance program led to this country's first all digital lightweight inertial navigation system (LINS) developed in the mid-1950's.

Highlights since then have included development of the Mark IV SINS (Ship's Inertial Navigation System) and AIMS (Airborne Inertial Measurement System), a platform attitude reference system produced for the NASA lunar landing simulator at Langley Field, Virginia.

In the latest development in the area of inertial platforms, Nortronics recently announced the first successful application of

an inertial platform (FLIP) supported by fluid instead to mechanical gimbals.

The new platform offers important advantages in reduced size and weight and has a unique capability for sustaining extremely high "g" loads.

"The system which we are providing to Lockheed for the C-5A is the outgrowth of all the inertial platform and digital computer technologies which we have accumulated and advanced in the past 18 years," Mr. Miller said.

The system will be extremely lightweight, totaling approximately 200 pounds.

The first C-5A, being developed under the direction of the Air Force Systems Command's Aeronautical Systems Division, will be delivered to the Military Air Lift Command in 1969.

Nortronics development work on the program will be centered at the Division's Hawthorne facility, Mr. Miller said.

## Credit Union Elects Officers, Declares Dividend of 6.25%

Northrop Credit Union members will receive a six and one-fourth (6¼) percent dividend on their 1965 deposits. Declaration of the dividend by the board of directors recently highlighted a busy round of activities involving the Credit Union since the first of the year.

In a meeting of shareholders held February 1, members voted to return a nine-member board of directors to office for another year, returned a three-member Credit committee to office, and selected one new member and four returning members to serve on the Supervisory committee.

One week later the board of directors elected John J. Richardson to serve as president of the Northrop Credit Union for 1966. D. H. Grothe was named vice president and Mary B. Delaney, secretary-treasurer. For subordinate officers the board named Mary Josalle and Florence Montgomery, assistant treasurers; Catherine Walker, cashier; Margaret Faubion, loan officer and Helen Walker, chairman of the Membership committee.

Serving on the 1966 board of directors with Mr. Richardson, Mr. Grothe and Mrs. Delaney are L. L. Cripe, R. F. Carroll, R. D. Hampton and W. D. Schramm of Norair, E. T. Jessick of Nortronics Anaheim and J. S. Penrod of Nortronics Palos Verdes.

H. J. Grothman is chairman of the Supervisory committee which includes C. G. Collins, G. W. Thornton and J. S. Woodward as returning members and J. J. Monaghan as a new member.

F. E. Wolfe will chair the Credit committee which includes J. L. Dew and L. W. Monger.

Mr. Richardson indicated the 1965 dividend is now being credited to member's accounts and that statements will be mailed to individuals reflecting the dividend during April. At the same time a special folder explaining the dividend and other Credit Union activities will be mailed.

During March the annual report of the Northrop Credit Union will be distributed with payroll checks.

Payment of the 6¼ percent dividend in 1965 marks the third consecutive year Northrop Credit Union has paid 6 percent or better in dividends.

All Northrop employees at the Corporate office, Northrop Norair and Northrop Nortronics West Coast facilities are eligible to become members of the Northrop Credit Union. The initial membership fee is only \$1 and with

the purchase of one share, for \$5, entitles the individual to full membership. Subsequent purchases of shares may be made through payroll deductions.

## Al Graber Named To Head Norair's Palmdale Facility

A. C. "Al" Graber, a veteran Northrop executive, has assumed duties as base administrator of Northrop Norair's Palmdale Production Flight facility.

Mr. Graber replaces Tom McCracken who retired recently.

Joining Northrop Norair in September 1941, Mr. Graber has held a number of responsible posts in a wide variety of production activities. He has been associated with the Palmdale facility since 1954 and since 1962 has served as superintendent of Manufacturing and Flight operations there.

## 19 Service Emblems Due in February

Northrop Nortronics West Coast installations are presenting 19 service emblems to veteran employees during the month of February who have completed either 10 or 15 years of service.

Fifteen-year emblems will go to Joe Porter, Dorothy Van Diest, Violet Lund, Donald Slawson, Garland Steiner, Paul Mansfield, Thomas Grettum, Edward Harrison and James Lynch.

Eligible for 10-year emblems are William Riesch, Theodore Stec, Lewis Kaldizar jr., Calvert Winfrey, Minor Campbell, Charles Stevens, Bernard Kringel, David Haley, Donald Kollanse and Jeanne Adams.

## TEAMS

(Continued from page 1)

project engineer, led general discussions.

Wes Toy, supervisor of Test Operations, was responsible for carrying out demonstrations with Jim Hulett coordinating all demonstration activities.

The TEAMS unit used in the demonstrations is a preproduction model scheduled to under go an extensive evaluation program.

It was completed in mid-December after a 10-month period that included Engineering design, testing and fabrication.

"I would be remiss if I did not point out the dedicated effort that went into preparing this unit for demonstration," Mr. Peterson said. "Under the guidance of Wes Toy, the Technical and Production personnel assigned to this program did a tremendous job under extremely tight schedules."

While the initial TEAMS unit is currently slated for an extensive evaluation program, it is not considered an experimental model, Project Engineer Withee pointed out.

"The TEAMS concept was proven with an earlier experimental unit known as NARATE (Navy Radar Automatic Test Equipment)," Mr. Withee said.

## YACHTSMAN: Second Place Won't Do

(Continued from page 1)

"The helmsman was having trouble with the Nam Sang," Mr. Grant reports, "because of built-in steering characteristics and the stiff wind."

"I told the captain of the port watch he'd better take the helm himself. We'd already dipped the spinnaker pole in the water a few times, once five feet deep."

Only two minutes at the helm and the watch captain was in trouble.

"Ed," he called out, "you'd better do something pretty quick."

"So I trimmed sail to make her handle easier."

The crew's action under Mr. Grant's command slowed the Nam Sang by a knot and three-quarters. She lost corrected-time over-all second place that night to the Nalu II, with the Hawaiian Islands already in sight. But she was still second boat to finish.

Built in the 30's, the 66-foot sloop hadn't come in better than 16th until Mr. Grant's theories were applied.

Then things changed: second in 1957 Ensenada race; second finisher and first in Class A, 1957 Honolulu; first finisher and over-all fleet winner, 1958 Ensenada.

Refurbishing of the Nam Sang included changes in the sails and hull and major applications of Grant-designed hardware and riggings never before seen on a racing yacht.

All the information garnered from her will be applied to the Torch with a few new twists thrown in.

The hull of the 32½-foot Torch has been modified from bow to stern more than once. Using mathematical formulas, the latest Little Torch hull shape can be translated to the larger Torch.

Little Torch has had 2 different

bows, 3 rudders, 4 keels and 2 sterns. She's the result of seven years that Mr. Grant studied the Nam Sang and other racing yachts.

"Talk to a professional naval architect about steering problems on racing yachts built today," he said, "and they'll ask you, 'What problems?'"

"But we had to reduce sail on the Nam Sang."

"The new Torch will be a boat you can drive no matter how high the wind. I designed her to run before a 50-mile trade wind with a limit spinnaker . . . and steer. No racing yacht in the water today can do that."

The Honolulu racers must run before vigorous trades for 1800 miles. If the Torch comes anywhere near Mr. Grant's visualizations, get ready to put your money on her in July of next year.



Sailing master and amateur naval architect Ed Grant holds template to stern of Little Torch during hull modification in San Pedro.



# NORTHROP NEWS

NORTHROP NORTRONICS

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## FIGHTER SQUADRON MAKES 6200-MILE FLIGHT TO NORWAY

Eleven Northrop F-5 supersonic jet fighters left Edwards AFB, California, last week on a 6200-mile flight to Norway to join the Royal Norwegian Air Force as first-line tactical fighters.

The squadron of twin-engine 1000-mile-per-hour airplanes comprise the initial delivery of a total of 64 F-5's being built by Northrop for the RNoAF.

In October a squadron of U.S. Air Force pilots flew 12 F-5's 8000 miles to South Vietnam for combat duty there, and in December four F-5's of a number being built for Iran flew 11,000 miles to that country, following the same fog-bound North Atlantic route planned for the flight to Norway.

The F-5 fighters which left Edwards AFB were destined for Rygge Air Station near Oslo. Three of the aircraft were piloted by Norwegian officers, while the others were flown by U.S. Air Force Tactical Air Command pilots.

It was the second time in 26 years that Northrop has supplied combat-type aircraft for Norway. In 1940, the company designed and began building 24 armed seaplanes for that Northern European nation. It was the first overseas country with which Northrop signed a military contract.

The seaplanes, designated N-3PB, served with distinction in World War II. They established a modern-day Norse legend by helping to sink the German battleship Bismarck.

The three-day intercontinental flight to Norway will establish several historical milestones.

It is one of the largest airborne deliveries of aircraft to an overseas ally of the United States since the middle of World War II, when pilots of other nations ferried bombers and transports from this country to their home bases. And it is the greatest number of Northrop F-5's to be delivered in one flight since the airplanes began entering the defense inventories of allied countries.



**UNDERWATER PLANNERS IN ACTION**—Gus Duke, Bill Poznik and Bob Amsler (from left) are typical of talented Nortronics team members working on Deep Submergence Systems Project. Team, working out of Anaheim and Washington, D.C., is carrying out duties in Nortronics' role as

prime management and engineering support contractor. Program aims at new methods and equipment for deep sea rescue and recovery and to improve man's capability for living and working underwater. Note artist concept of possible approaches.

## GATES SUCCEEDS GEN. TIMBERLAKE IN INTERNATIONAL

C. R. (Bob) Gates yesterday succeeded General Patrick W. Timberlake as vice president—International, and Frank S. Perigo replaced Mr. Gates as manager of Marketing at Northrop Norair.

General Timberlake, who retired from the Air Force in 1957, has announced his "second retirement," to become effective at the end of this year. Until that time he will retain the title of Corporate vice president and in addition will serve as special assistant—International.

He will perform assignments on request of the International Division, Corporate management.

(See **MARKETING**, page 6)



Gen. Timberlake

## Second Quarter Earnings, Backlog Show Increases

Northrop Corporation's consolidated net earnings for the second quarter of the current fiscal year amounted to \$2,773,000, or 66 cents per share, an increase of 30 percent over the earnings of \$2,013,000, or 49 cents per share, in the second quarter of last year, Thomas V. Jones, president and chairman, has announced.

Sales and other income for the three months period, which ended January 23, 1966, totaled \$85,189,000 as compared with \$87,505,000 in the same period last year.

Earnings for the first half of the fiscal year amounted to \$4,464,000, equivalent to \$1.07 per share on the 4,170,910 shares outstanding, according to Mr. Jones. This was approximately 10 percent higher than the \$4,020,000 earned in the same period a year ago which was equivalent to 98 cents per share on the 4,096,309 shares then outstanding.

309 shares then outstanding.

Sales and other income for the six months just ended amounted to \$155,752,000 as compared with \$160,276,000 in the first half of last year.

"As indicated earlier, the second quarter results show a substantial improvement over the first quarter," Mr. Jones said. "The per share earnings of 66 cents were 60 percent higher than the 41 cents per share earned in the first quarter of the current fiscal year," he said. "This higher net income reflects the contribution to earnings of the rapidly expanding communications product lines, as well as electronics and aircraft deliveries to a growing list of customers," Mr. Jones said.

The company's sales backlog currently totals approximately \$398,000,000 not including some \$90,000,000 in aircraft work now in production but still awaiting final contract negotiation. This compares with a backlog of approximately \$360,476,000 a year ago, according to Mr. Jones. The backlog is spread over a range of increasingly diversified programs in communications, electronics, ordnance products, missiles and space.

### Dividend Declared

Northrop board of directors has declared a quarterly dividend of 25 cents per share, payable March 12 to stock of record February 25.

### Gun Club Sought

Nortronics NRC has taken steps to re-activate its Gun Club and invited parties interested in taking part to contact the Palos Verdes Personnel office, ext. 441.

## DSSP Staff: 'Strong Right Arm of Navy'

Northrop Corporation has marshalled an impressive and highly versatile array of talents and skills to perform assigned tasks in the U.S. Navy's Deep Submergence Systems Project (DSSP).

Working out of headquarters at Nortronics Anaheim and Washington, D.C., the team has ranged far and wide in recent weeks to work with many groups and organizations.



Mr. Krapf

Nortronics was selected by the Navy as its systems engineering support contractor for DSSP, the most extensive underwater research and development program to date. It is a mind-stretching and far-reaching effort to develop new methods and equipment for deep sea rescue and recovery and to improve man's capability for living and working underwater.

The Nortronics program is headed by Art Krapf, a veteran submariner and scientist, a former U.S. Navy captain and one-time director of the Naval Research Laboratory at Washington, D.C.

Mr. Krapf directs a full-time staff of 22 specialists. Sixteen are at Nortronics Anaheim, the remainder in Washington under Deputy Program Manager D. A. Delo. Gus Duke supervises the over-all Engineering unit.

Team skills cover many fields, human factors, hydrodynamics, reliability, electronics, acoustics and systems analysis to name a few.

"Our team contains a majority of basic talents we require," Mr. Krapf said. "More important, we can call on any of Northrop's many resources to meet special requirements."

Mr. Krapf indicated valuable program contributions have been made and will continue to be made by Norair, Northrop Space Laboratories, Ventura and all of Northrop Nortronics.

A five-year, multimillion dollar project, DSSP is aimed at improving navy capabilities in four basic undersea operations: the recovery of survivors of submarine disasters; creation of underwater bases where divers may live and work; recovery of large ships sunk below the ocean surface; and the development of a submersible, manned vehicle which could recover aerospace components and conduct oceanographic investigations at a depth of 20,000 feet.

Originally assigned to the Navy's Special Projects office, the program gained new status recently with the creation of a special DSSP project office under the Chief of Naval Material with administrative support from the Bureau of Ships.

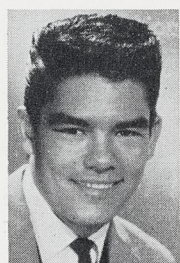
(See **DSSP**, page 6)

## READING, 'RITING AND ROCKING

## Gabe's Schedule Makes Friends Shudder

Gabriel D. "Gabe" Apodaca sometimes maintains a busy personal schedule that makes his less active friends shudder.

He works full-time as an engineering aide on the third shift at Nortronics Hawthorne,



Mr. Apodaca

attends Los Angeles Metropolitan working towards a degree (due in January 1967) in Business Data Processing, and sings professionally with "The Montereys."

"My job with Northrop comes first, of course, then I

concentrate on my studies," Mr. Apodaca said. "My singing engagements are primarily on weekends at school dances and stage productions."

Mr. Apodaca has been with Northrop for over a year.

"The Montereys" got together shortly after graduating from high school (at Mt. Carmel) and have worked together since. Though Gabe Apodaca plays the piano and guitar and other members of the group are capable of performing with instruments, they concentrate on singing only. Their specialty is the rock and roll beat so popular with the younger generation.

They have cut three records. "My Special Girl/Don't You

Remember" came in 1961 on the Skyla label; "For Sentimental Reasons" in 1963 on the Crescendo label; and "Goodbye My Love/It Hurts Me So" in 1964 on the Delta label.

"Each record sold copies, but none have approached the 'hit' level," Mr. Apodaca said.

Gabe Apodaca is the father of two small children. He has studied at Los Angeles State College as well as his present school and hopes to further his education later at UCLA.

Other members of "The Montereys" are Roy Aguila, also a working student; Hector Aguilar, an Industrial Arts teacher; and Bob Jimenez, currently serving in the U.S. Army.



## FRINGE BENEFITS

## Recreation Clubs: Thirty Ways To Shake That Isolated Feeling



By WILLIAM LARRABEE  
Vice President—Industrial Relations

It is not unusual in any large company that a person working at a bench or a desk all day may have no opportunity to meet other people and may get to feeling more like a number than an individual. Any progressive company like Northrop recognizes that people feel more at home, enjoy their work more, and do better work if they know others around them. It is also very clear that the best way to get acquainted is to spend time with those who have similar hobbies and interests.

The Northrop recreation clubs are just what the doctor ordered for getting together off hours and for getting rid of that isolated feeling. Northrop people are active in just about every type of extracurricular activity. Large numbers of them get together throughout the year in club activities which they run themselves and in which they have common interests.

All of this takes money, of course, and the question is often asked as to how these activities are financed. Nearly all of the funds come from the vending machines in our plants. The commissions from those machines go to the recreation clubs, and are spent by the clubs themselves, not the company, to support club activities.

Money is paid to the clubs based on contracts which are set up with vending machine companies selected by competitive bidding. This competitive bidding gets a bit complicated but,

basically, the qualified company which offers to pay the largest commission per cup of coffee, candy bar, package of cigarettes, et cetera, sold, gets the right to install its machines. Thus, every time we buy something in a vending machine, we know that a part of our purchase price is coming back to us in the form of our recreational activities.

I wish that we could talk about all of the things which are done by our various groups. Over 30 different activities are carried on and, certainly, most of us should be able to find something worthwhile in one of these groups. Among other things, there are all kinds of sports. Perhaps the most popular of these is skiing. We have skiing enthusiasts here at the Corporate offices who can be recognized by their crutches and their pulled ligaments.

We do have a real champion at Northrop, however. Elvira Kuehnegger of NSL, whose father is one of our fine Northrop scientists, was raised in Switzerland and has been in about every type of contest that one can imagine both in Europe and in this country. She has taught skiing and I am sure that she would be delighted to hear from any skiing enthusiast. She heads up the Norair/Nortronics Ski Club and has sponsored five trips this winter to the ski country, a fashion show, a Christmas party, and

(See FRINGE BENEFITS, page 4)



Elvira Kuehnegger (left), Barbara Dukes (above), and Orville Mitchell (right), have discovered that NRC offers activities closely related to their personal interest.

## DEADLINE NEARS FOR ENROLLING IN MEDICARE PLAN

By BILL WALDON  
Corporate Group Insurance Administrator

Medicare health benefits are your right, not charity. You become eligible merely by reaching age 65. It doesn't matter whether you are working or retired, or drawing social security benefits, or what your income is, or what assets you own. So almost everyone is eligible for basic plan benefits, and eligible to enroll for the voluntary plan.

Were you 65 prior to January 1, 1966? Have you enrolled? If not, check with your social security office now. The enrollment deadline under the Medicare Law is March 31, 1966, just about a month away. Failure to sign up can cause you to forfeit the chance to enroll until October 1967 and the chance to receive any benefits until July 1968. Also a 10% higher premium will be assessed for each year in which you fail to enroll.

If you are currently working, you must also enroll for the hospital benefit. This benefit is automatic only for individuals who are receiving social security benefits.

When you sign up you will get an unprecedented bargain insurance rate. A private insurance rate. (See MEDICARE, page 5)

## Speed Record Set For Engine Change

From Vietnam comes word, via the "Bien Hoa Bugle," of a new F-5 engine change record set by maintenance personnel of the 4503d Tactical Fighter Squadron.

The time was one hour and 55 minutes and included an engine change and test hop. The change was carried out in an open revetment under adverse field conditions.

Two weeks prior to the new record a similar operation was carried out in two hours, 20 minutes.



Like a witch's brew, alkali agitation-created foam rises in Nortronics Anaheim anodizing area cleaning tanks. William Scott handles part of load of components dropped into tank as another step in cleaning prior to processing. Most parts hit this tank first before moving on to other processing operations.

## Channel 28 to Air Technology Series

An hour-long weekly television program which will examine current developments in aerospace technology has been announced by Station KCET (Channel 28), and three of the first four programs should be of particular interest to Northrop employees.

Kicking off the series on March 8 will be a documentary on the Gemini program, with emphasis on GT-7 and 6 and the upcoming GT-8.

On March 15, the program will be devoted to lifting body flight test research. A great deal of the film footage on lifting bodies will be furnished by Northrop Norair which built the M2-F2 and HL-10 research vehicles for NASA.

KCET, Los Angeles' educational television station, also announced that the March 29 program would be devoted to Project Apollo.

## FROM BILLY SUNDAY TO THE KENNEDYS

# Branzetti Views History Through a Camera Lens

It would be hard to visualize Joe Branzetti in any profession other than photography.

He is a born perfectionist, a stickler for details. His pleasing "cameraside" manner brings out the best in his subjects. His technique bespeaks years of experience.

"Joe the photographer," as Mr. Branzetti is most often called, has been a familiar figure at Northrop Norair for 15 years and many hundreds of people have been caught in his active lens.

Mr. Branzetti tackles each assignment with concentration, leaving idle chatter to others. But when he can be induced to talk, he is an interesting individual. He speaks of almost 60 years as a professional photographer, of a time when he was a favorite lensman for what may well pass as American aristocrats, of building his own business, retirement, boredom and a second career with Northrop.

Born in 1891 at Gaeta, Italy, Mr. Branzetti grew up in a studio operated by his father and a brother. From his early years he was a sort of handy man, errand-boy who was allowed to use the studio equipment only when everyone else retired for an afternoon nap, a local custom.

In 1908 Mr. Branzetti escorted his sister to the United States to keep a wedding date. He liked the experience so well he crossed five times in a four-year period and only settled down to live in the United States after war broke out in Europe.

"My brother-in-law gave me my first real camera, an Eastman Kodak 122 folding type," Mr. Branzetti said. "It was a wonderful day for me to have my own camera."

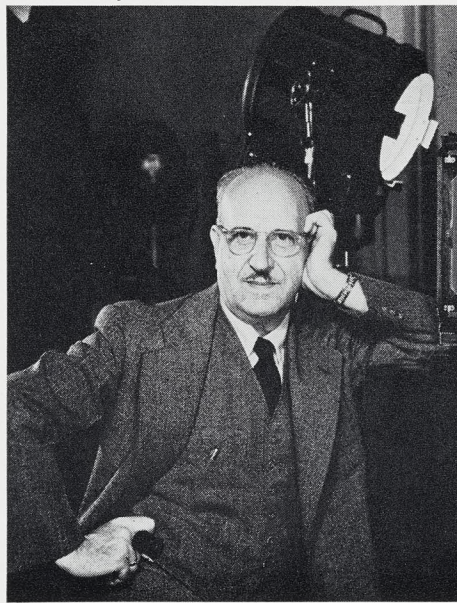
Because he knew nothing but photography, Mr. Branzetti joined Marceau Studios in Boston, later shifting to Bachrach Studio, one of the nation's best photographic establishments.

From menial darkroom assignments and re-touching work, Mr. Branzetti graduated to camera work as an assistant. His first big break was rather humorous.

"My boss was unable to keep an appointment with Billy and Ma Sunday," Mr. Branzetti recalls. "I filled in and must have been a sight, waving my arms and cooing in Italian, since I knew very little English. The portraits came out just right and helped me get other assignments with other Bostonians."

Over the next few years the names in Mr. Branzetti's appointment book in-

cluded most of the blueblood of the nation. He caught in his lens members of the Franklin D. Roosevelt family and the Joseph Kennedy family, when the two U.S. Senators and the late President were children. Other names like Count Tolstoi and Admiral Byrd were there alongside the DuPonts, Fullers, Curlys, Saltonstalls, Liggetts, Danas, Schraffs and many others.



Then came the crash of 1929 and Mr. Branzetti, like most others, lost everything.

"With the help of my wife and four children I opened my own studio and it prospered," Mr. Branzetti said. "By 1950 I was able to retire. I came to California to go fishing. The fishing was not too good, but I liked the climate. So I stayed."

After only a few months of ideal life Mr. Branzetti ended his retirement by joining Northrop.

Mr. Branzetti's son, John, is also a photographer and helped establish the Nortronics Anaheim photolab where he still works.

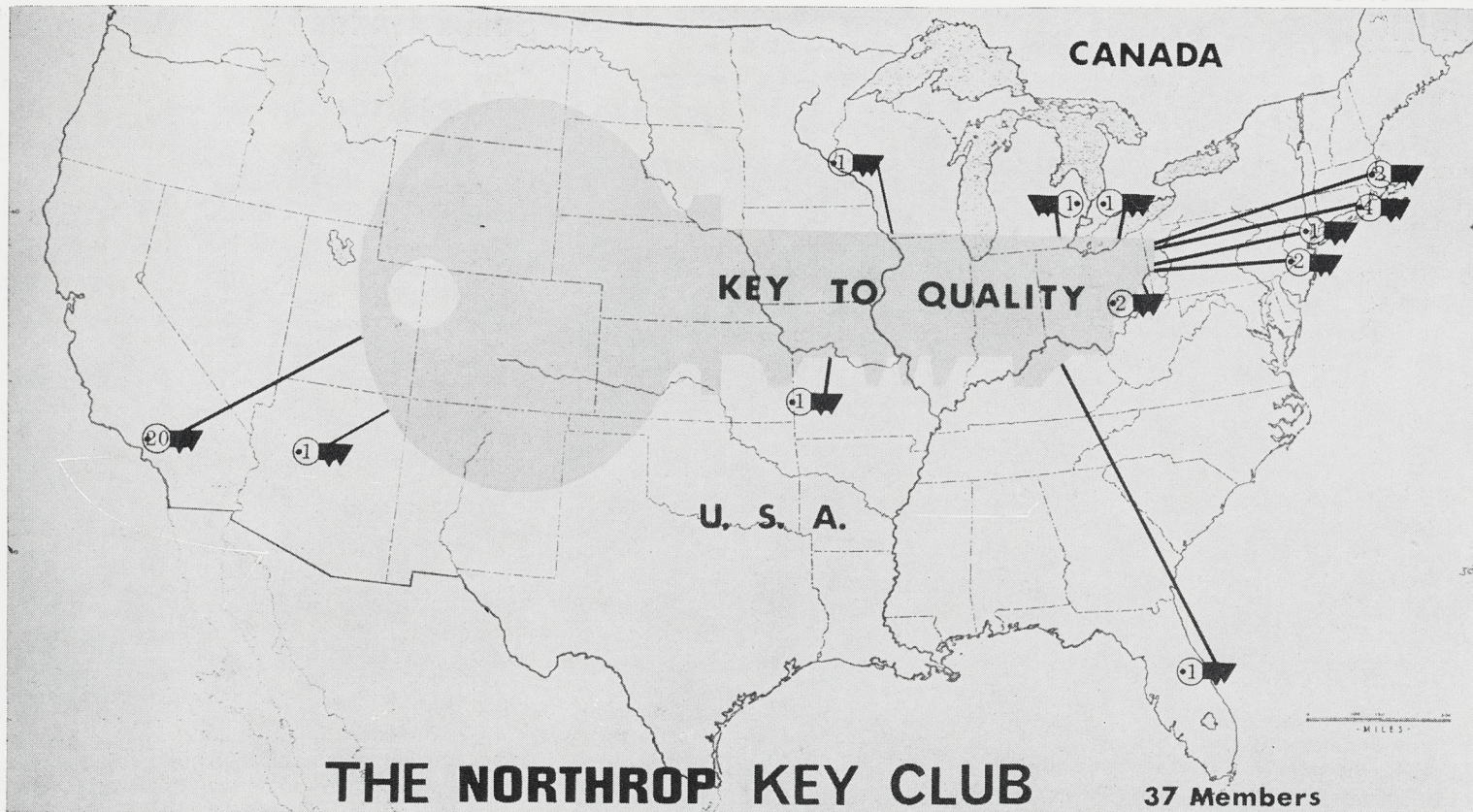
Mr. Branzetti's hobby is painting in oil.

"A good painting, like a good photograph, takes time," Mr. Branzetti said, "time to catch just the right amounts of light, expression and composition."

Mr. Branzetti feels very few people can go before a camera and strike just the right pose the first time.

"You must first get your subjects to relax," Mr. Branzetti said. "If you can find one weak spot, something the subject is apprehensive about, and work it out, then you'll get the best from a subject."





## This Is the Key to Quality, Color It Green

A travel guide to quality performance among Northrop's suppliers of aerospace and defense components would have to include such scattered locations as Paramus, New Jersey; Sun Valley, California; Kitchener, Ontario, Canada; Joplin, Missouri; Litchfield Park, Arizona; Windsor Locks, Connecticut; and Bedford, Ohio.

These localities are among the more than 30 in the United States and Canada which have members in the most unique "key club" now in existence.

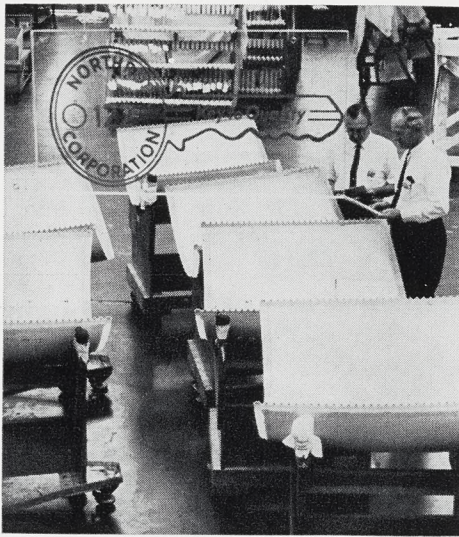
To date, 37 of these members—suppliers of systems and parts for Northrop products—have earned the coveted Northrop Key Quality Award for consistent high-level performance in product quality, compliance with delivery requirements and cost effectiveness.

Twenty-one of the companies earned the award in 1965, the best year in the three-year history of the program.

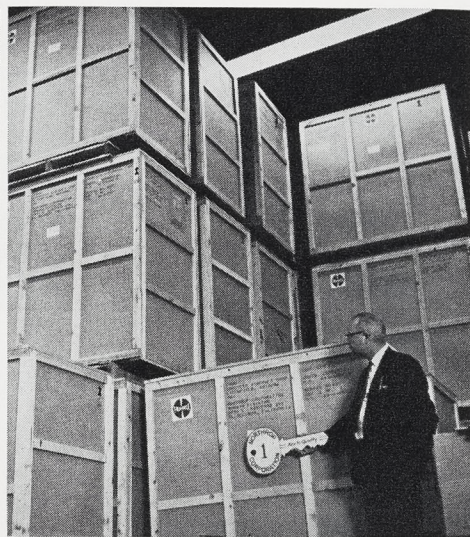
Two awards have already been made this year, and according to administrators of the program at Northrop, the status and benefits of being a Key Award holder is creating interest on a rapidly accelerating scale among the hundreds of company suppliers who can become eligible for this distinction.

One of the most satisfying aspects of the program is the enthusiasm shown by Key Award recipients, their associates, and government officials at all levels.

In recognition of an award made by Nortronics Precision Products department of Norwood, Massachusetts to Speedring Corporation of Warren, Michigan—which manufactures precision



Goodyear Aerospace Company, manufacturer of F-5 and T-38 canopy assemblies, thinks enough of Northrop Key Award program to hang transparent replica of key from ceiling of assembly facility (left photo). Northrop QC expert, Doc Parker (right photo), makes mental note of savings from program, which makes it possible for huge crates to be moved directly to stores without unpacking or inspecting.



machined components for gyroscopes—Michigan Governor George Romney sent this message:

"Congratulations on the selection of your company by Northrop Corporation to receive their Key Award. I am sure the skill of your employees and the ability of corporate management have deserved recognition of this type for some time. Michigan is proud of the contributions you have made to the nation's aerospace program."

As one Northrop executive said, "The Speedring award is typical of the importance suppliers attach to this achieve-

ment. On some occasions, the entire work force of a company gets together for the ceremony. Frequently, there are high-ranking military representatives in attendance, as well as local community leaders and press representatives."

This point is well proven by management quotations from other scattered Key Awardees.

At Akron, Ohio, where General Tire and Rubber was honored, Robert Mahan, manager of the company's Government and Aviation department, said of the award: "It's not easily gained and it's a tribute to all General Tire employ-

ees who made this honor possible. Winning of the award proves once again that production of a quality product is worth the extra effort."

At Long Island, New York, an executive of Liquidometer Division of Simmonds Precision Products, Inc., said: "To companies in the aerospace industry, the Northrop Key Quality Award attests to the highest degree of quality, cost and scheduling control. It was presented as a tribute to Liquidometer for its fuel gaging systems which are currently aboard Northrop's F-5 and T-38 aircraft."

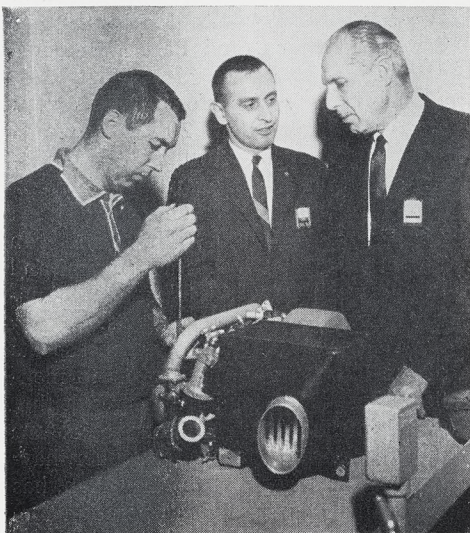
However, the real story of the program lies in the interorganizational and interdivisional aspects of the Key Plan.

Launched three years ago on the premise that supplier excellence should be recognized on a total performance basis, Quality Control and Materiel organizations are now jointly working to a single set of standards for seller evaluation. These criteria—which are recognized and accepted by all divisions of the corporation—place almost equal emphasis on four fronts: quality of workmanship, control of cost, adherence to delivery commitments, and consistency of performance.

In short, administrators of the program sum up these attributes for earning the Key Award with two words—"management integrity."

Another frequently heard phrase among program administrators is "level of confidence." This is another collective assessment which Northrop makes

(See GREEN KEY, page 4)



Awards ceremonies at companies receiving the Northrop Green Key Award may take many forms, but most of the time it is a complete company get-together. The newest member of the Key Club, left photo, is Hamilton Standard Division at Windsor Locks and Broadbrook, Connecticut. R. S. Catlin, Northrop Norair manager of Quality Control, observes how quality is built into F-5 component as Frank Galante, Northrop QC representative (center) describes operation. In center photo, Nortronics



PPD procurement chief, Paul Bohn, addresses employees of American Beryllium Company, Jacksonville, Florida, during ceremony. Three employees of Lomita, California's Aerospace Structures Division of Automation Industries, Inc., right photo, attach tapes from their company's products to model of F-5. On another occasion, during presentation to Goodyear Aerospace Company of Litchfield Park, Arizona, F-5 tactical fighter was flown to plant for employees to inspect.





## MANUFACTURING

## Splitting Hairs With a 26-Ton Giant

Taking measurements down to 1/30th the diameter of a human hair is not a capability easily associated with a giant of a machine weighing 55,000 pounds.

But at Northrop Norair just such a machine is helping fill a vital role assuring extremely close tolerances required of aerodynamic surfaces on supersonic aircraft.

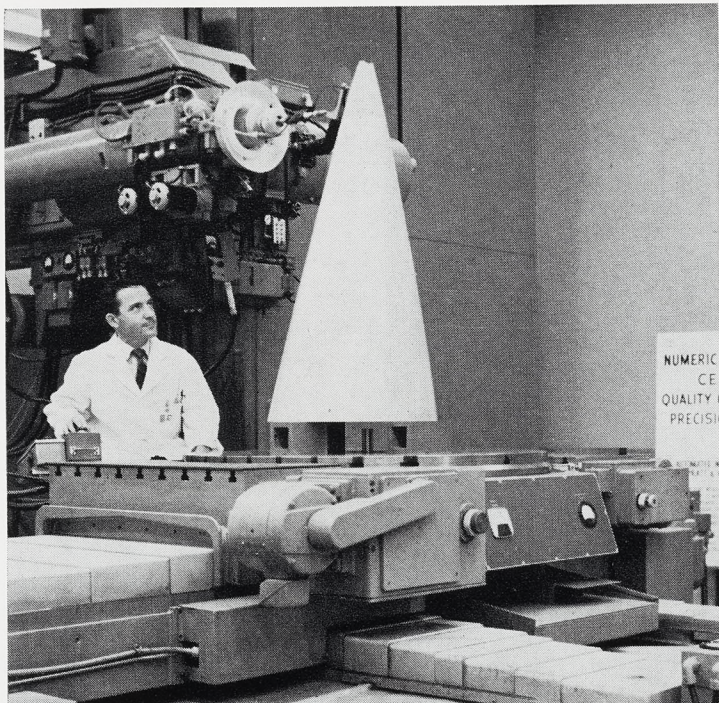
This machine, one of only four of its type ever built, is a Pratt and Whitney 4E coordinate measuring machine.

Capable of being controlled by numerical or manual means, the machine is employed in the Fabrication and Tool Inspection function of Quality Control.

It is designed to aid in checking items containing any number of surfaces as well as bosses or holes which might be on any or all of these surfaces. Delicately balanced, despite its bulk, the machine moves on five axes to inspect location, squareness, parallel and angular relationships, and sizes on both interior and exterior surfaces.

Prior to acquisition of this machine, Norair relied primarily on close quality control being exercised on all details going into each subassembly and proper location of such details in assembly jigs for the accuracy of aerodynamic surfaces.

As the F-5 program began to gain momentum about three years



**NUMERIC METROLOGY IN ACTION**—Intricate coordinate measuring machine in use at Northrop Norair measures nose cone assembly down to .0001 inch (1/30th the diameter of human hair). E. L. Cornelius is shown at controls of unit that can be controlled by manual or numerical methods.

ago it became apparent that some means was needed to eliminate or reduce the number of specialized check fixtures required. The coordinate measuring machine was obtained and tailored to this task.

"Our original requirement was for 50 to 60 specialized check fixtures, each intricate and costly to build," said Bill

Hunt, Quality Control supervisor. "This machine made it possible for us to eliminate at least 38 of these fixtures."

Since that time the coordinate measuring machine has more than proved its worth in verifying the accuracy of master tools, bonding fixtures, detail parts and assemblies.

## FRINGE BENEFITS

(Continued from page 2)

many other activities.

The Northrop Ventura Rod and Gun Club is one of our very active organizations made up of ardent hunters and fishermen. It sponsors a rather unusual event to climax its year. Each season two members go deer hunting. If one of them gets a deer, there is a big venison dinner, supplemented by baked beans and cole slaw.

We think of this as a sport for the big outdoor male types but one of the recent deer hunters was Barbara Dukes who has been at Northrop Ventura for 15 years. Barbara is expert at hunting and fishing and is a spark plug of the Rod and Gun Club.

One of the biggest words which we have describing the activities of a club is "numismatics". In ordinary English, this means "coin collecting". We have a real authority on coin collecting at Nortronics Anaheim. Orville Mitchell heads up the group there which has 130

enthusiastic members. He has been collecting for 27 years and is a nationally recognized authority on the subject. Perhaps more of us should empty our old piggy banks and join the club.

All of the people in the recreation clubs have learned how much more they get out of their work at Northrop through the associations which they have made. Your management wishes that everyone could be involved in one or more of these activities.

There are choral groups, Bible study societies, the Gem and Mineral Club which puts on such wonderful exhibits, the Art Club which has demonstrated some amazing talent among our people, and many, many more. Our Industrial Relations offices can put any employee in touch with the head of a group involved in an interesting hobby and, certainly, everyone will benefit who takes this means of meeting his fellow workers.

## Spain Awards Two Contracts To Page Iberica

Wat, S.A. of Madrid, in association with Page Communications Engineers of Washington, D.C. has been awarded two contracts totalling more than one million dollars by the Spanish Air Ministry.

Page Communications Engineers and Wat, S.A. recently formed Page Iberica, a jointly-owned corporation in Madrid, to provide design-through-management service for telecommunications projects in Spain.

A pioneer and world leader in communications systems technology, design, installation and management, Page engineered and constructed the \$19 million UK-Spain System for the U.S. Air Force in 1963.

Page presently is installing three satellite communications earth stations for the Communications Satellite Corporation and a similar station for the Overseas Telecommunications Commission of Australia as part of a worldwide system to provide tracking and data acquisition for the NASA Apollo Program and ultimate relief for the Pacific and Southeast Asia coaxial cable systems.

Wat, S.A., an electrical installation company which has experienced rapid growth during the past five years, has recently expanded into the field of telecommunications.

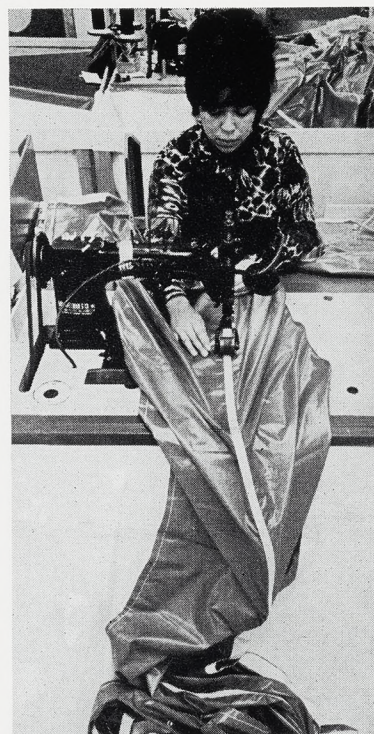
## Acacia Club Inducts New Slate of Officers

The Flying Wing Acacia Club held its 25th annual dinner-dance for the installation of new officers and the honoring of past officers recently.

New officers are: Don Riley, president; Otis Teague, vice president; Dick Brown, secretary; Lloyd Raburn, treasurer; and Les Hickman, sergeant-at-arms.

Founded in 1942, the club is open to all master masons employed by Northrop or retired from any of its divisions. Information is available through Dick Brown, ext. 2891, Norair.

Jerry Steiner is the immediate past president and served as installing officer at the dinner.



Carolyn Regalado of Northrop Ventura's Paradyamics Laboratory is sewing three-needle main seam for the Division's steerable Cloverleaf parachute. The Cloverleaf, being developed under contract to NASA's Manned Spacecraft Center, Houston, completed a highly successful aerial drop test at El Centro last month.

## Symphonaires Join Industry Festival

Northrop Symphonaires will participate in the annual Industrial Choral Music Festival, sponsored by the Los Angeles Bureau of Music, scheduled for 8 p.m. March 5 at the East Los Angeles Junior College.

Guest conductor for the affair will be Fred Swan of the Bureau of Music. Paul Brizuela is permanent director.

According to Gene Boggess, Symphonaires commissioner, choral groups from numerous companies in the Los Angeles area will perform individually and then combine their voices for a program accompanied by the Los Angeles Philharmonic Orchestra.

The Symphonaires have participated in the event for the past 10 years, Mr. Boggess said.

The concert will be free and open to the public.

## CONTINUOUS EARNINGS

Every Series E United States Savings Bond ever sold continues to earn interest as a result of extensions granted on the life of the bonds.

## GREEN KEY: Unlocks Door to Opportunity and Profit

(Continued from page 3)

of its suppliers. Key Award winners enjoy a high level of confidence and, as one of the Key Plan developers put it:

"We look upon these companies as if they were an extension of our own operation. We have faith in their management and trust in their products."

When a company reaches this confidence level, its products are subject to minimum inspection when received. Fuel cells manufactured by Dominion Rubber Company of Canada previously required 21 hours inspection per lot (one of six) which totaled 5544 man-hours per year in Norair's Receiving and Inspection department. Since Dominion Rubber was awarded the green key, inspection time has been reduced to 15.9 hours per year.

This example points up one important reason Northrop management is enthusiastic about the concrete results of the Key Plan. Elimination of parts inspection time alone, from only 16 Key

Award suppliers, produced cost savings of over \$100,000 during FY 65. Other facets of the plan—such as curtailment of travel and need for "special" teams to investigate problem areas—have generated additional savings more difficult to identify, but nonetheless real.

Northrop's Materiel men are also "sold" on cost improvement aspects of procurement operations with Key Award winners. As one Northrop Materiel director said, "Of course, quality of workmanship is what we are all seeking, but a perfect product which arrives weeks late or costs more than it should causes as much havoc with our production schedules and profit position as a poor product does."

A benefit to buyers as well as the supplier is the fact that the green key awarded by one division frequently unlocks the door to another Northrop division.

In effect, the "Northrop Key Program" provides subcontractors with a single,

centralized avenue for doing business with Northrop—it provides a multi-divisional link with its suppliers," as one Northrop Corporate official phrased it.

Many cases of duplication in screening suppliers—and determining their ability to produce quality products on time and within budget—are eliminated.

However, this is not the only instance of duplication within divisions that has been eliminated. Before Northrop contracts with a supplier, a complete survey of that company's facilities, financial and management stability, and quality programs must be made. This data is made available to each division.

The men who perform the surveys are guided by standardized, corporate-wide procedures and policies, worked out jointly between corporate Materiel and Quality Control committees. The committees are made up of Materiel and Quality Control directors, respectively, from each West Coast division, Northrop Space Laboratories, and from

the East, Northrop Precision Products department, Nortronics Marine Equipment department, and Page Communications Engineers.

The men who perform the surveys are, at the minimum, 20-year veterans who are as equally familiar with materiel criteria as quality control. They can quote NASA requirements as well as Air Force, Army and Navy and can support Northrop Ventura's Gemini and Apollo work as well as Nortronics Anaheim Army ordnance contracts.

While there are many other aspects of the Key Plan too numerous to mention, there is one outstanding result that is repeatedly being demonstrated. On more than one occasion, a supplier, having met the criteria of the Key Plan, has found his own business operation improved to the point where he automatically places himself in a more favorable and competitive cost position.

A Northrop "Key" also unlocks the door to opportunity and profit!



# Classified

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads. Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

## For Sale

**Go-Cart**, homemade w/belt drive Briggs & Stratton 3 hp eng., \$65. Inglewood, OR 7-7355. A

**TV, Sentinel**, 21" blonde console, needs work, tubes good, \$10. Torrance, 323-1698. A

**Cemetery Lot**, dble. interment, El Sereno Sec., Inglewood, \$625. Inglewood, OR 2-8468. A

**House**, 2-bdrm., 4 yrs. old, 60' x 160' lot, close to Lake Elsinore & Railroad Canyon Lake, \$10,500. Gardena, DA 4-1593. A

**VW Bumpers**, \$16. Huntington Bch., 714-897-8201. A

**Typewriter**, Olympia Deluxe, portable, \$60. Torrance, DA 6-7232. A

**Chrome Wheels**, 4 Astro, \$100. La Habra, 213-691-0106. A

**Trampoline**, king size, 5' x 10', strong steel tubing frame 7' x 12', \$55. Box 401. A

**Home**, 3-bdrm., 2 baths, fireplace, built-in dishwasher & stove; newly redecorated, \$27,500. Torrance, DA 9-6885. A

**Telescope**, 6" astronomical-type, 3 eye pieces, \$150. Manhattan Bch., 379-4775. A

**Truck**, 1964, Chevrolet, r/h, 3-spd., \$1750. Torrance, 322-2869. A

**Range**, elec., Westinghouse, coppertone, 4 burners, auto. oven & timer, \$125. Gardena, 324-0274. A

**Rattan Set**, 3-pc. sectional w/club chair & matching table, zipper cover, innerspring cushions, \$100. Inglewood, OS 5-7050. A

**Freezer**, Frigidaire, 13 cu. ft., 90-lb., \$110. Torrance, 320-0596. A

**Ford Fairlane**, 1958, p/s, r/h, \$250. El Segundo, EA 2-3320. A

**Surfboard**, 9' 2", Bing, \$50. Camarillo, 805-482-1090. A

**Rambler Rebel**, 1959, 4-dr. sedan, \$150. Manhattan Bch., 372-0644 between noon & 4 p.m. A

**TV**, 24", Packard Bell, mahogany, \$75. L.A., 645-6815. A

**Outboard Engine**, Evinrude, 4-cyl., 5 hp, \$35. Inglewood, OR 1-1660. A

**Ducati Scrambler**, 1965, 250 cc, extra access., less than 1000 miles, \$595. Hawthorne, 676-9736. A

**Bicycle**, 26", \$8. Gardena, 329-9484. A

**Truck**, 1965, Chevrolet, 1/2-ton, V-8, r/h, custom cab, wrap around bumper, trailer hitch, \$1850. Lakewood, HA 5-6844. A

**Chevrolet**, 1956, Nomad, stick, new tires & chrome rev. rims w/knockoffs, record player, rebuilt 283 eng., \$995. Lawndale, 371-0194. A

**Radial Saw**, 7" Shopmate, on stand, use as power hand saw, recond., \$50. Inglewood, OR 6-6896. A

**Bench Grinder**, Mall, on 30" pedestal 1/3 hp 6" dble. wheel 3650 rpm, \$50. Hawthorne, OS 5-3866. A

**House**, 4-bdrm., family rm., over 1800 sq. ft., fenced yd., 2-car gar., walk to school, shops, 1st trust deed, \$24,900 at 6 1/4% \$203 mo., \$29,900. P.V. Pen., FR 5-0567. A

**Furnace**, dual wall-type, Western Holly, 35,000 btu/hr., manual control, instal. sheets, \$40. Hawthorne, OS 6-6415. A

**Ford Fairlane 500**, 1957, 2-dr., p/s, p/b, new tires, \$250. Torrance, 320-5552. A

**Ford**, 1957, 4-dr., recent eng. o/haul, good tires, \$295. Gardena, DA 4-2972. A

**Washing Machine**, Kenmore auto., \$15. Torrance, 371-9730. A

**House**, 3-bdrm., 1 1/2-bath, fireplace, forced air, heat, lge. lot, existing bal. of GI loan, 5 1/4% is \$21,070, \$22,950 or rent for \$175 mo. Gardena, 213-DA-9-6297. A

**MGA convt.**, 1958, custom top & tonneau cover, \$850. Playa del Rey, 398-1458. A

**Bicycle**, girl's, 26", \$10. Hawthorne, OS 5-5522. A

**Boat Trailer**, factory built for 12'-18", adjustable to any hull, lights, \$65. Inglewood, OR 1-2058. A

**Home**, 3-bdrm., newly decorated, \$24,500. Hawthorne, OS 5-1726. A

**Couch**, Naugahyde, aqua, foam rubber rev. cushions, 84" long, \$160. West L.A., GR 3-3168. A

**Coins**, 1960P cents, bu bag, \$75. L.A., 939-3519. A

**Transceiver & antenna**, Gonset 10-meter, \$125. Fullerton, 529-5327. A

**House**, 3-bdrm., 20' x 20' rumpus rm., near schools, fwy. & Northrop, fenced yd., 80% or 90% loan, \$23,750. Gardena, DA 9-2904. A

**Plymouth**, 1965, 2-dr., h/top, auto. trans., r/h, 8000 mi., \$2295. Panorama City, 894-6507. A

**NSU Prinz**, 1959, sedan, \$175. Hawthorne, 675-4505. A

**Datsun roadster**, 1965, low mileage, \$1685. Torrance, 370-6529. A

**Pontiac station wagon**, 1956, low miles, auto. trans., r/h, \$375. Torrance, 324-1270. A

**Cabin Cruiser**, 27' Chris-Craft, sleeps 4, completely equipped, ship-to-shore radio, bow rail, swim step, many extras, \$5500. Torrance, DA 9-3900. A

## For Sale

**Suzuki Sport 50**, 1965, 4-spd., 50 cc, 1000 miles, \$190. Diamond Bar, 714-526-2348. A

**Motor Scooter**, Allstate, 65 cc, rebuilt eng., new seat & paint, 3-spd., \$110. Inglewood, OS 6-8893. A

**Land**, Antelope Valley, 5 & 10 acres, \$250 dn., \$35 mo. Los Alamitos, 431-7056. A

**Freezer**, 22 cu. ft. Coldspot, \$185. Anaheim, 776-1374. A

**TV**, 16" Silvertone, portable, \$65. Inglewood, 677-5705. A

**Radio & Record player**, 1964, Admiral, stereo, 6' antique white & gold cabinet, \$300. Hawthorne, DA 9-9835. A

**Desk**, modern dk. blonde, cost \$138, \$75. Hawthorne, OS 9-2337. A

**Borgward**, 1957, 2-dr. sedan, Isabella model, r/h, \$250. L.A., AX 3-2354. A

**Rug**, 9 x 12, wool, 3 yrs. old, \$25. Inglewood, 674-1796. A

**Wet Suit**, worn once, size, small, \$20. Torrance, 375-6071. A

**Volkswagen**, sedan, 1958, new clutch, brakes, \$550. L.A., 931-6937. A

**Acreage**, 2 1/2-acre parcels, in Antelope Valley, \$15 dn. \$15 mo., \$1495. Torrance, FR 8-1026. A

**Trailer**, box-type, 4' x 6', wooden bed, 2' steel reinforced wood sides, 26.50 x 15 wheels, tailgate, \$75. Anaheim, 714-776-1023. A

**Encyclopedia**, World Book, complete vols., \$75. Bellflower, TO 7-4362. A

**MG**, 1964, 2-dr. sedan, take over \$70 mo. pymnts., \$900. Torrance, FR 5-8804. A

**Radial Arm Saw**, 10", saw blades, buffing wheels, metal stand, locking casters, 110 or 220 volt, \$150. Torrance, 376-4771. A

**Mustang 2+2** fastback, 1965, 289 4-barrel Cruis-O-Matic, disc brakes, full console, extras, 10,000 orig. miles, \$500 & take over pymnts. or \$2800. Torrance, 327-0272. A

**Sprite**, 1959, new tires, radio, good top, \$695. Redondo, 374-4786. A

**House**, 4-bdrm., family rm., 2 1/2 baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

**House**, 3 bdrm., patio & fenced block wall, near schools & Del Amo shopping center, \$23,900. Torrance, 325-4789. A

**Duplex Bed**, 30", foam mattresses & pad, \$45. Gardena, DA 9-5225. A

**Piano**, upright, Krell, \$85. Hawthorne, OS 9-2610. A

**Outboard Motor**, 7 1/2 hp Fishing Scott, 1961, lightweight, \$150. Gardena, DA 4-8853. A

**Mustang**, 1965, p/s, p/b, flake top, air condition, \$2500. Hawthorne, 644-1007. A

**VW sunroof**, 1963, \$1150. Long Bch., 596-1280. A

**Bedroom Furniture**, dble. bed w/ortho. mattress & box spring, bookcase headboard, 5-dwr. dresser, night stand, light mahogany, \$95. Anaheim, PR 4-2779. A

**Volkswagen**, 1965 sedan, low mileage, sunroof, \$1525. Long Bch., 633-5938. A

**Volkswagen sunroof sedan**, 1960, body needs repair, \$700. Rolling Hills Ests., FR 8-2190. A

**Organ**, Thomas, single keyboard, antique finish, \$275. P.V. Pen., FR 7-3888. A

**Stereo Equipment**, Eico HF86K, 28 watt amplifier, HF85K preamplifier, HFT94K & HFT-90K tuners, 2 12" Calrad speakers, 1 encl., \$85. Long Bch., GE 9-6432. A

**House**, 3-bdrm. split-level, 1 1/2 bath, built-ins, dble. gar., 1 mile to ocean, no down to Vets, \$20,000. Redondo Bch., 374-2433. A

**Exec. Home**, 8 mos. old, 2400 sq. ft., fully carpeted, 3 bdrm. & den, 3 baths, 3 decks, split-level, near all freeways, 10% down, \$35,900. Redondo Bch., 378-7116. A

**Cocktail Table**, 22" x 60", oval terrazzo top, \$15. Box 402. A

**Ford coupe**, 1940, 1959 Pontiac eng., solid lifters, racing cam, customized, \$800 or best offer. Hawthorne, OS 5-7371. A

**Own-Your-Own-Apt.**, 2-bdrms., 2 baths, kitchen built-ins, air cond., pvt. patio, pool, gar. & guest parking, FHA 4 1/2% mortgage, \$125 mo., \$18,500. Hollywood, HO 5-5314. A

**Range**, gas, Gaffers & Sattler, \$25. Gardena, 324-3760. A

**T Bird**, 1961, convt., all power, new paint, orig. owner, \$1245. W. L.A., GR 2-2928. A

**Home**, 3-bdrm., 1-bath, hwd. flrs., service porch area, R-2, 50'x150' lot, close to shopping, elem. & jr. high schools, 10 yrs. old, \$20,900. Redondo Bch., 379-6824. A

**Mercury Monterey**, 1959, good tires, \$350. Inglewood, OR 1-6603. A

**Trumpet & case**, \$75. Torrance, 324-5422. A

**House**, 3-bdrm., family rm., dining rm., lge. kitchen, 2 1/2 bath, built-in dishwasher & stove, dble. gar., near beach, \$21,750. Huntington Bch., 536-1621. A

**Sewing Machine**, portable, Montgomery Ward, \$20. Long Bch., GA 3-1363. A

**Revolver**, 38 cal. police special, 2 holsters, belt, hand cuffs, shell pockets, \$80. Gardena, OS 5-2159. A

**Ford Station Wagon**, 1957, 2-dr. ranch wagon, T-Bird V-8 eng., p/s, r/h, trailer hitch, orig. owner, \$275. Rolling Hills Ests., FR 8-5175. A

**Home**, 4-bdrm. incl. master suite, 3 baths, family rm., custom landscaping, Lunada Bay ocean view, occupied 6 mos., terms, \$50,750. P.V. Ests., 377-4372. A

**Motorcycle**, 1965 Rex, 500 miles, 95 cc, \$200. Hawthorne, 679-9375. A

**Wardrobe**, child's, complete, girl sizes 5, 6 & 6x, 11 dresses, coat, capris, raincoat, sweaters, play clothes, \$20. Hawthorne, OS 5-7965. A

**Encyclopedias**, 15 vol. Britannica Jr., 1957 ed., \$60. San Pedro, TE 3-9430. A

## Wanted to Buy

**Golf Clubs**, set of woods, irons & bag, Wilson staff or equivalent quality. Inglewood, 672-5545. B

**Hardtop** for 1959 Sprite. Torrance, TE 5-6221. B

**Dodge or Plymouth**, 1940, mechanical cond. not important. Whittier, OX 3-4117. B

## For Trade

**Equity** in 3-bdrm., 1 1/2-bath home in Desert View Highlands, Palmdale, trade for acreage Palmdale, Lancaster area or home, vicinity Northrop Hawthorne plant. Redondo Bch., FR 5-1064. C

**Trade** Blue Chip stamp books for Green stamp books. No. Hollywood, 347-3428. C

## Rentals Offered

**Apt.**, 2-bdrm., 2-bath, w/lge. patio & dble. garage, built-ins, avail. Mar. 15, \$145 mo. Fullerton, TA 8-2857. E

**Apt.**, 1-bdrm., delux, built-ins, pool, \$95. Redondo Bch., 376-2117. E

**Apt.**, deluxe 2-bdrm., unfurn., beam ceilings, built-ins, gar., 1/2 blk. from beach, \$150 mo. Hawthorne, FR 9-9996. E

**Apt.**, 1-bdrm., built-in stove, closed gar., laundry facilities, \$89 mo. Torrance, 328-6955. E

**Apt.**, 3-bdrm., furn. or unfurn., close to schools & public trans., \$115-\$135. San Pedro, TE 1-3737. E

**Apt.**, 2-bdrm., unfurn., built-in stove & oven, hot & cold water pd., close to Northrop, \$95. Redondo Bch., FR 9-9786. E

**Apt.**, 2-bdrm., unfurn., built-ins, pvt. patio, \$115 mo. Hawthorne, 676-5622. E

**Bachelor Cottage**, completely furnished, \$75. Hawthorne, OS 6-5464. E

**Duplex**, 2-bdrm., built-ins, encl. yard, gar., extras, 1 child OK, \$125. Hawthorne, 674-4470. E

**Apt.**, 1-bdrm., utilities pd., furn., parking space, single person desired, \$75 mo. Lawndale, OS 5-9695. E

**Studio Apt.**, 2 & 3-bdrm., flat-type, 2 baths, carports, children OK, \$125 & up. Los Alamitos, 679-5487, 430-1245. E

**Studio Apt.**, 3-bdrm., 2-bath, unfurn., pvt. patio, closed gar., near park & schools, \$165 mo. Torrance, FR 5-0867. E

**Apt.**, 1-bdrm., unfurn. or furn., single, built-ins, refrig. & air conditioning, 20 min. to Norair, \$87.50. Mar Vista, 391-7781. E

**Apt.**, 2-bdrm., 3-minute walk to Northrop, fenced playyard w/playground equip., children OK, \$100 mo. & up. Hawthorne, OS 5-6032. E

**Apt.**, 2-bdrm., furn., sep. dining area, lge. closets, disposal, 4 short blocks to Northrop, utilities paid, \$125 mo. San Pedro, TE 3-2512. E

**Apt.**, 3-bdrm., 2 baths, patio, serv. porch, family rm., fireplace, built-in oven, range, dishwasher & intercom, hot water & trash pd., near Norair, \$175. Hawthorne, 679-1358. E

**Apt.**, 2-bdrm., stove, built-ins, \$110 mo.; bachelor apt., utilities pd., 2 blocks from Norair, \$90 mo. Hawthorne, OS 6-7417. E

## Child Care Wanted

**Babysitter**, full-time, in Hawthorne area, for 3-yr.-old boy. Hawthorne, 676-3575. H

## Personals

On behalf of my family, I would like to thank everyone for their assistance & kindness during our recent bereavement. CHET GUZINSKI. L

Typing done in my home, reasonable, pick-up & deliver. Inglewood, OS 6-1475. L

**Flying Club**, fly Cessna 172 or Bonanza, students OK. P.V., 377-4216, 398-3962. L

**Typewriters**, old, used, wanted to be sent to Mary Knoll Mission in Chile. Torrance, FA 8-7945. L

## For Sale or Trade

**Corvette**, 1960 h/top, fuel injection, 4-spd., r/h, chrome wheels, good tires, \$1475 or take trade in. Pacific Palisades, GL 4-7262, GL 4-3931. M

**Boat**, 16' w/trailer, \$295 or trade for boat, 14' w/trailer. Hawthorne, 676-3912. M

## Cinerama Theatre Party Announced

A Northrop-wide theatre party for the March 20 showing of the Cinerama feature "Battle of the Bulge" was announced this week by combined NRC organizations.

The 5 p.m. Northrop party will be at the Pacific's Cinerama Theatre, 6360 Sunset Blvd., Hollywood.

Three hundred reserved loge and orchestra seats have been acquired and will be sold through NRC for \$2.60 and \$2.35 respectively, reflecting a 40-cent per ticket saving.

Tickets may be purchased through all NRC outlets with a March 16 cutoff date.

## SAFETY FEATURE

U.S. Savings Bonds cannot be used as collateral because only the registered owner can redeem them. This is one of the many safety features of Savings Bonds.

## AND THANKS, GENERAL



Major General Ben I. Funk (right), commander of the Air Force Space Systems Division, AFSC, receives plaque and citation from Northrop Northronics' Dave Kessler. Honors recognized general's participation in Joint Technical Conference under sponsorship of five top technical societies. Mr. Kessler is a senior member of Orange Empire Section, American Society for Quality Control, one of the five groups.

## MEDICARE: Group Insurance Plan to Change, Avoids Duplication

(Continued from page 2)

er would charge much more to provide the entire Medicare hospital and voluntary doctor insurance package. Your cost is \$3 per month.

Effective July 1, 1966, the Northrop Corporation plan of Group Insurance will reduce benefits by the benefits available as a result of the Medicare Law. For you who have the Northrop Retired Major Medical Plan of insurance, there will be a new plan of insurance provided at a reduced rate which will not duplicate the Medicare coverage.

A similar change will be made in the insurance coverage of those people still working after age 65 which will be of benefit to them. So do not deprive yourself of complete coverage by failing to enroll for the Medicare benefit plans, both the basic hospital plan at no

cost and the voluntary plan for doctor services at \$3 monthly cost.

The Medicare benefits will be effective July 1, 1966, but you must enroll before March 31, 1966.

If you are less than age 65, but your wife/husband is age 65 or older, Medicare benefits apply to the person over 65. But enrollment is necessary to obtain the hospital, doctor coverage.

If you were not age 65 prior to January 1, 1966, your first enrollment period runs for 7 months beginning with the third month immediately before the month you reach 65, and ending 3 months after you are 65. For example, if you reach 65 in August, you may sign up any time between May 1 and November 31.

To assist eligible individuals, and especially those who are currently employed, the Social Security offices in the greater Los Angeles area have arranged special evening hours of operations. This convenient service is being provided from 5:30 to 8:30 p.m. each Wednesday by the area offices which include those at:

Inglewood, 608 E. Manchester Blvd.; Los Angeles, 419 South Hill St.; Torrance, 1408 Crenshaw Blvd.; Santa Monica, 1514 Sixth St.; Van Nuys, 4631 Van Nuys Blvd.; and Santa Ana, 1438 East First Street.

These and other Social Security offices are open Monday through Friday from 8:30 a.m. to 4:30 p.m.

The Long Beach office located at 1235 Pacific Ave. will remain open Thursday evenings from 4:45 to 6:45 p.m.

The Ventura office at 4274 Telegraph Road, will be open from 5:30 to 8:30 p.m. on both Wednesday and Thursday evenings. No evening hours have been scheduled by the Lancaster office.

Whether working or not — sign up if you are eligible. If you have the slightest question as to whether you should enroll, contact your Social Security office right away.

## Rides Wanted

7 a.m. — 3:45 p.m.

Hawthorne & 190th, Torrance. Betty Evans, Norair, ext. 2544, 370-4101. 2

7:30 a.m. — 4:15 p.m.

Atlantic & Valley Blvd., Alhambra. Adriana Franco, Norair, ext. 2389, 283-5415. 3

Gould Ave. & Hermosa Ave. or Manhattan Ave., Hermosa Beach. Penny Prouty, Norair, ext. 1458, OS 9-6520. 3

La Brea & Centinela, Inglewood. Coleen Conner, Norair, ext. 1972. 3

8 a.m. — 4:45 p.m.

Manchester & Inglewood Ave., Inglewood. Sidney Wanger, Nortronics Anaheim ext. 1043, 677-4134. 5

Vermont & Olympic, Los Angeles. H. Shibata, Nortronics Hawthorne ext. 641, 388-1667. 5

Sepulveda & Hawthorne Blvd., Torrance. Virginia Davis, Norair, ext. 2021, 325-4789. 5

Crenshaw & Stocker, Los Angeles. Evelyn M. Martin, Norair, ext. 1611, 679-7154. 5

From San Fernando Valley-Topanga or Devonshire St. to Hawthorne. S. D. Parr, Nortronics Haw., ext. 670, 527-1590. 5

Orange Ave. & Del Amo, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 5

## Rides Offered

8 a.m. — 4:45 p.m.

Manchester & Inglewood Ave., Inglewood. Sidney Wanger, Nortronics Anaheim ext. 1043, 677-4134. 15

Vermont & Olympic, Los Angeles. H. Shibata, Nortronics Hawthorne ext. 641, 388-1667. 15

Broadway & 11th, Santa Monica. North of Santa Monica Fwy., west of Bundy Blvd. to heart of Santa Monica. Earl Koons, Norair ext. 2708, EX 4-3345. 15

From San Fernando Valley-Topanga or Devonshire St. to Hawthorne. S. D. Parr, Nortronics Haw., ext. 670, 527-1590. 15

Orange Ave. & Del Amo, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 15



## F-5 Can Take It, Fatigue Tests Prove

Northrop's F-5 fighters are built to take it.

This point was evident last month with the analysis of an 18-month comprehensive fatigue certification test program.

Results showed a production F-5 had withstood loads simulating those encountered in 8000 flight hours and 8000 landings. The achievement was double the requirements for the operational service life of the aircraft.

More than 240 different loading conditions were applied collectively a total of 500,000 times. Wing load applications were four times the expected nominal in-flight load occurrences.

Northrop Norair's Engineering Laboratories under Royal Jackman performed the fatigue certification test program under contract to the Air Force's Aeronautical Systems Division. Sherman Lew was in direct charge of the tests, while Stan Murnane provided test criteria.

The tests were a part of the Structural Fatigue Certification Program requirements of the Air Force for supersonic fighter aircraft.

Fatigue certification tests for the F-5 began in July 1964 and were completed last month.

A second complete aircraft structure was static tested to 100 percent of ultimate design loads in a successful program completed last year.

Validity of the design loads, utilized for the static and fatigue test programs, was established by an in-flight Loads Survey Program. An F-5 flight test aircraft was extensively instrumented to record significant flight parameters with particular emphasis on measuring loads on the wing, fuselage and empennage. Approximately 500 in-flight maneuvers were performed at various speeds and altitudes for different airplane store configurations. Landing and taxi operations, on both paved and sod runways, were performed to determine elastic response characteristics.

### Exhibits, Equipment In Annual Gem Show

Working exhibits and demonstrations of lapidary arts and equipment will be featured at the seventh annual NRC Gem and Mineral Show April 23 and 24 at the Norair Product Display building.

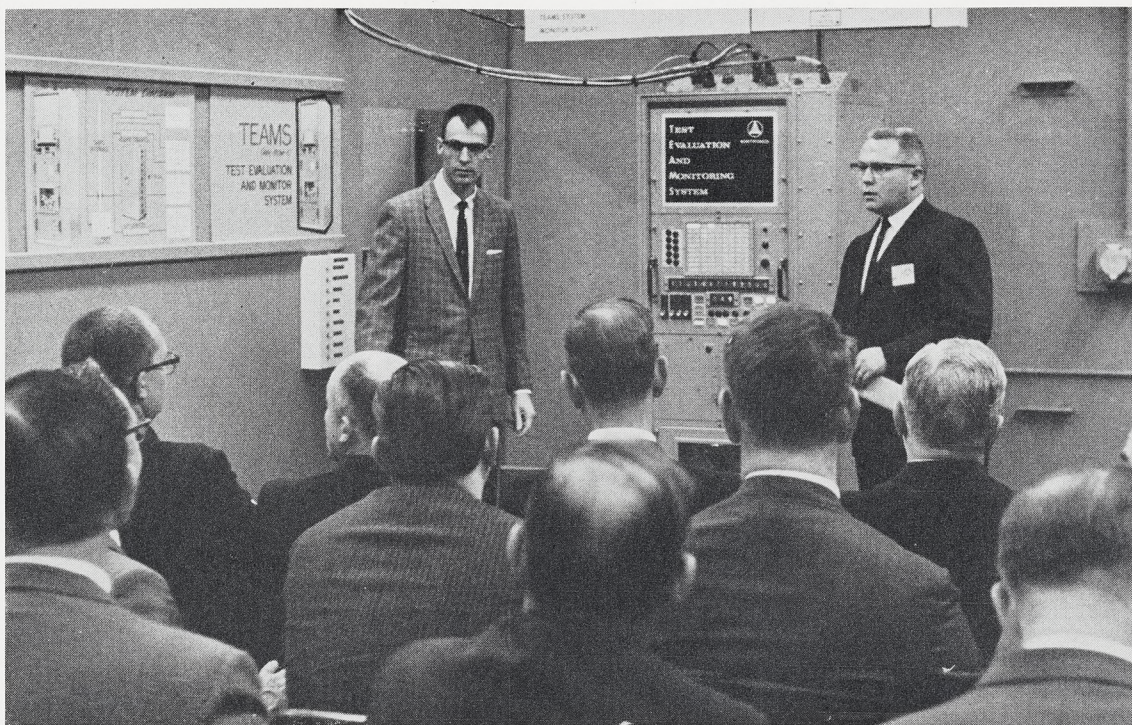
Show Manager Mike Michels promises a full range of interesting activities during this free program.

### 'Second Shifter Day' For Bloodmobile Set

Northrop's second shifters in the Hawthorne area will have their annual "day at the bloodbank" this month when a special first shift-second shift bloodmobile visit is held.

Second shifters will donate from 4:30 to 9:30 p.m., March 22; first shifters from 7:30 to 11:30 a.m., March 23. Bloodmobile operations will center in the Norair Product Display building. Signup cards are presently available throughout the Hawthorne complex.

## DEBUT FOR TEAMS



**SIMULATING SHIPBOARD ENVIRONMENT**—Recent TEAMS program review and demonstration held at Nortronics Anaheim drew key Navy officers and civilian personnel for first look at new advanced automatic test unit. Here TEAMS unit shares stage with Nortronics' Jim Hulett, left, and

Hal Withee, TEAMS project engineer during technical discussions. Outstanding job was performed by various groups in bringing this system from design through fabrication and initial tests in just 10 months.

(Photo by Val Hawes)

## Aerial Test Of Cloverleaf 'Looks Good'

Less than four months after award of a NASA contract, the first aerial drop test of Northrop Ventura's controllable, gliding parachute has been successfully completed at El Centro.

At a press conference at the Manned Spacecraft Center, Houston, following the test, NASA officials told newsmen "the Cloverleaf that you saw looks very, very good."

The 56-foot Cloverleaf configuration, when fully perfected, will offer a gliding range of up to two feet for each foot of vertical descent and capability by which a descending space vehicle could be steered to a pre-determined landing site.

The first flight test of the 56-foot Cloverleaf used a 5000-pound test module — developed by the Division specifically for the test program — and was dropped from an aircraft flying at 6000 feet.

The test was designed only to demonstrate deployment and opening characteristics of the parachute. Guidance and control techniques will be demonstrated later in a planned series of aerial drop tests.

At the press conference, a NASA official said, "From the standpoint of performance, I would say that we had an unqualified complete success."

The Cloverleaf configuration consists of three lobes which, when descending, look very much like three parachutes together.

In response to questions about specific applications of the Northrop steerable chute, NASA's Lee Norman said:

"Basically we are going to develop the technology so that management can have an option of landing modes for future spacecraft, not be restricted just to land, but to be able to land on land or water."

## DSSP: Technology for a New World

(Continued from page 1)

As systems engineering support contractor, Nortronics is assisting the Navy in the management, integration and coordination of all phases of the program. This ranges from the establishment of criteria for the design of all systems and the training of personnel to the analysis of performance and missions.

"We fill an unusual role in this project as a sort of strong right arm for the Navy," Mr. Krapf said. "We will not fabricate hardware, but will work closely with those who do."

In discussing the importance of DSSP Mr. Krapf noted that seven-tenths of the earth's surface is covered by salt water and man has just begun to probe the depths in search of riches known to be there. He feels programs like DSSP are similar to the launching of the first satellites into space. "We will move forward in exploring the deep in much the same way we have moved into space—in an orderly and logical fashion," he added.

"Northrop's work with DSSP will certainly lead to the beginning of a capability in an entirely new field," Mr. Krapf said.

Over the past four months Nortronics DSSP team members have taken part in a wide range of activities. They have helped formulate a Project Master Plan (PMP), offered advice on facilities, took part in training plans, worked closely in human engineering fields, reviewed the efforts of project contractors, studied rescue and support vehicle criteria, and participated in conferences covering DSSP theory, rescue vessels, controls and displays, sensors and many other topics.

One interesting endeavor related to the Sea Lab program which takes man into the sea to work and live. Sea Lab I descended off Bermuda in July 1964 with four men for an 11-day period.

Sea Lab II was lowered off La Jolla late last year and stayed below 45 days with 28 men, working in shifts, taking part. Nortronics is currently preparing a detailed physiological evaluation of this program with the able support of the Northrop

Space Labs.

Sea Lab III will go down at a point to be selected in early 1967, also for a 45-day stay. Nortronics is presently writing operating specifications for this effort.

### MARKETING

(Continued from page 1)

the divisions and Northrop subsidiaries.

Mr. Gates, Norair Marketing manager for the past four years, joined Northrop in 1955 as a development planner and later became director of Development Planning.

"Mr. Gates brings a wealth of management experience in both government and industry to his new duties, and we welcome him to the leadership of our International team," President and Chairman Thomas V. Jones said in announcing the appointment.

Mr. Perego has been Corporate director of Domestic Marketing operations. He joined Northrop in 1964 as Corporate director of Manned Aircraft Marketing. Mr. Perego was a marketing executive with Raytheon Company and General Dynamics Corporation, respectively, prior to his association with Northrop.

In announcing Mr. Perego's appointment, Richard E. Horner, senior vice president and Norair general manager, noted that the new manager had been closely associated with Norair's marketing program for the past two years.

General Timberlake is credited by Mr. Jones as being "largely instrumental in building a sound business posture for our company in many areas of the world."

At the time of his retirement from the Air Force, General Timberlake was commander of Allied Air Forces in Southern Europe. He served with distinction in World War II as head of the Ninth Bomber Command, chief of staff of the Mediterranean Air Command and commander of the Eighth Air Force.

In their new positions, both General Timberlake and Mr. Gates will report to Glenn R. Lord, Corporate vice president—Marketing.

Among DSSP team members enthusiasm for the over-all program is running especially high, Mr. Duke reports.

"We all find the work challenging and interesting," Mr. Duke said. "There is a feeling of pioneering, of taking part in something with a great deal of future."

Mr. Duke noted several team members have enrolled, on their own time and at their own expense, in diving courses. Others collect every bit of information they can find on the sea and underwater exploration for references.

Leon Danforth, a team hydrodynamicist, spent hours of his own time preparing and illustrating a special study entitled "The Feasibility of an Off-Shore Underwater Oil Drilling Platform." He presented it February 22 before an Off-Shore Exploration Conference in Long Beach.

## FAMILIAR BACKDROP



Nortronics-built Hawk missile launcher forms backdrop for this trio taking part in formal opening ceremonies for a new Defense Contract Administration Services district office at Anaheim. They are (from left) Frank Lynch, Nortronics vice president and manager of Operations, Commander William D. Buckbee, USN, chief of the Nortronics-Anaheim DCAS office, and Frederick Stevens, Northrop vice president and general manager at Nortronics. Affair was held February 16. Commander Buckbee's office reports directly to the new Anaheim district office.



# NORTHROP NEWS

NORTHROP NORTRONICS

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## Skoshi Tiger Group Gets Shot at North

Northrop F-5 tactical fighters flew strike missions against Communist North Vietnam for the first time late last month, according to Second Air Division headquarters.

The F-5's, flown by pilots of the 4503d Tactical Fighter Squadron, have been attacking Viet Cong targets in the south since the beginning of Project Skoshi Tiger last November 1.

Statistics released by the Air Force indicate that F-5 pilots have dropped more than 7400 bombs, fired almost 4900 rockets and expended almost 650,000 20mm cannon rounds between November and late February.

Pilots of the 4503d have logged about 2450 sorties against the Viet Cong, claiming 231 enemy dead. The F-5 squadron has been credited with 1931 buildings destroyed and another 1701 damaged.

While no official information on targets damaged by the first mission of the F-5's into the north, the Air Force said that the planes attacked routes of travel.

The Air Force also announced that four pilots of the 4503d had each logged their 100th combat sortie in an F-5.

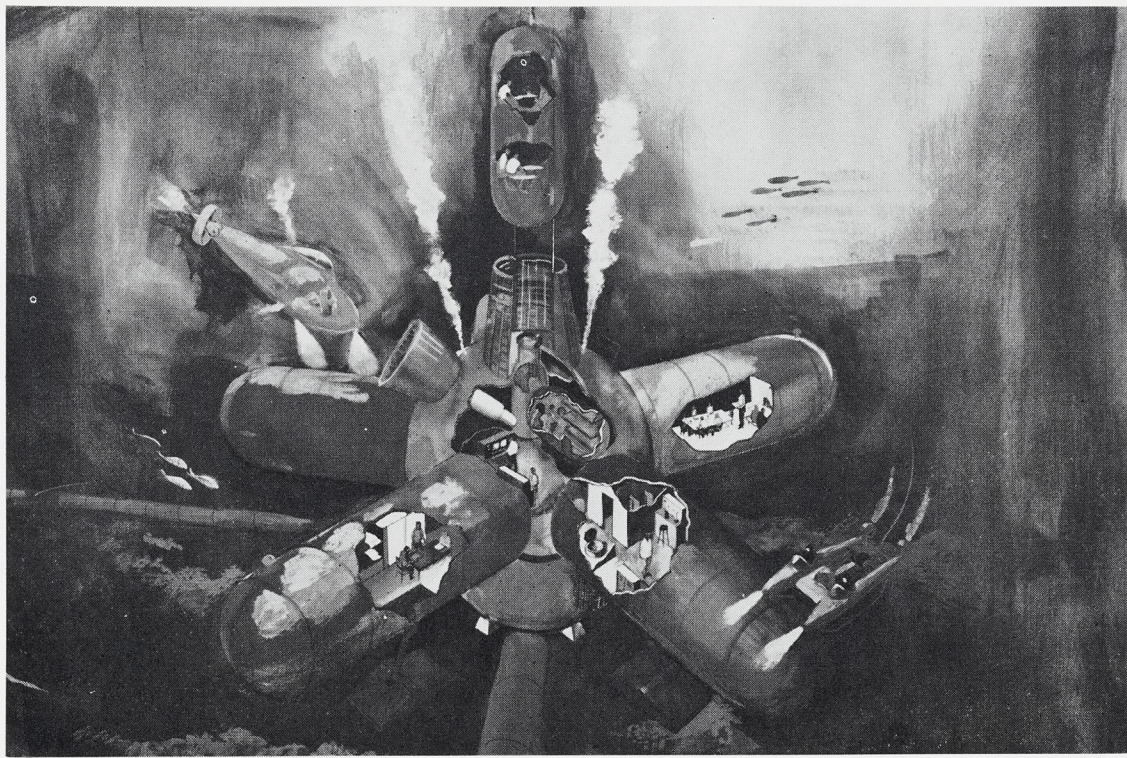
## 'Kwan Yin' Limps Home, Will Survive

Phil Akin's Kwan Yin is safely berthed at Redondo Beach this week following a five-month, hair-raising sailing voyage from Boston.

Mr. Akin of Nortronics Palos Verdes acquired the 58-foot ketch and sailed her to Acapulco, a voyage beset by broken booms, masts, fouled engines and a tow by an Argentine submarine (NORTHROP NEWS, January 19).

Her latest misadventures included a broken mast, transmission trouble and assorted other problems in a trip up the Baja California coast.

"She's a bit ragged and worn, but still in good condition despite her trials," Mr. Akin reports. "She'll get the overhaul and face lifting she needs and should be as good as new."



**MAN-IN-THE-SEA** — Personnel habitat conceptualized by Leon Danforth, Northrop Nortronics senior hydrodynamicist, in study on undersea platform for offshore oil drilling resembles Jacques Cousteau's Conshelf II starfish house. First level of center module is brain center for drilling

operations and control of life support equipment. Since workers would have to spend two days in a decompression chamber (second level of center module) prior to returning to the surface, chamber is equipped with bunks and recreation materials.

## AIRBORNE COMPUTER, FIRST OF THREE, DELIVERED TO AF

Nortronics has delivered the first of three NDC-1050A lightweight digital computers to Holloman Air Force Base, New Mexico, for use by the Air Force in

(See photo on page 6)

the development of its Low Cost Aircraft Inertial Navigation system.

Representatives of Detachment 1, Air Force Avionics Laboratory, from Holloman, observed acceptance tests of the computer unit at Nortronics Hawthorne. Environmental testing will be completed at the base.

Lou Columbano, project engineer on the NDC-1050A, reports that the Computer Systems section was scheduled to deliver the second computer system by March 14 and the third unit is due by May 4.

The NDC-1050A is the first conductively cooled computer built at Nortronics. It is designed to operate from -55 degrees to +71 degrees Centigrade. Unlike most computers it requires no convective or forced air within the unit.

## New Electronics Package Speeds Aerial Photo Data

A device being developed for the Navy by Northrop Nortronics for use with aerial photography equipment will be capable of recording flight data on film more accurately and 30 times faster than present systems.

Just as holes are made in a key punch card to provide data in a "numerical code" to a computer, a group of dots are placed on each frame of film by the Nortronics device, called a "digital code writer."

The digital code writer receives a continuous input of flight data, such as the time, altitude, position of the aircraft and administrative details which would be required for a final report on a photographic mission.

As each frame of film is exposed, the 576 neon lamps in the data writer each print a single, tiny dot, in a block, on the frame. When the negative is printed, the dot pattern, called a "code block," can be interpreted by an electronic reading device. The code block is written in computer bi-

nary-coded decimal form.

Previous systems of this type have used a cathode ray tube (which should be familiar to all television set owners), which was capable of placing only one dot at a time on the film. Even so it only took 15 milliseconds to put the code block on a negative.

However, this wasn't fast enough because of the speed of the film moving through the camera, according to Bob Redwitz, project engineer at Palos Verdes. The film is moved at a fixed speed to compensate for aircraft motion.

"The Northrop digital data writer will take only a half millisecond to place the information on the film," he said.

"In addition, because the dots are all imprinted on the film at one time by the neon lamps, the relationship between dots is more accurate," he added. "And the Northrop system permits an unprecedented quality in high-contrast, sharply defined dots."

(See CODE WRITER, page 6)

## Plan Outlined For Undersea Oil Drilling

The oil industry probably didn't get the answers to all their problems related to offshore drilling at the 1966 Offshore Exploration Conference in Long Beach, but as the result of the systems approach used by Northrop Nortronics' Leon Danforth



Mr. Danforth

in a comprehensive analysis of undersea platforms, oilmen now have a better idea of what questions to ask. A senior hydrodynamicist on the Deep Submergence Systems Program (DSSP) staff at Anaheim, Mr. Danforth's 87-page document discussed the feasibility and ramifications in design, mooring, emplacement, manning and servicing an undersea oil drilling operation at depths of 200 to 1200 feet.

The paper covered hardware conceptual designs, life support equipment and techniques for installing and operating a platform in which a crew of 30 to 45 men could work two-week shifts on the ocean floor.

"The idea of moving drilling operations from the hostile surface environment was prompted by the loss of lives and more than a hundred million dollars last year alone by oil companies operating offshore drilling rigs," Mr. Danforth said.

"Oil company losses were compounded by downed production time because of hurricanes, gales and shifting foundations on numerous occasions."

Hurricane Betsy in one fell swoop wiped out more than one hundred offshore rigs, costing from six to twelve million dollars each, last year.

Distinct areas of underwater exploration and drilling have been discussed in the past, but this was the first time the systems approach has been applied to prov-

(See DRILLING, page 6)

## ANNE HOWELL CONDUCTS ASSEMBLY CLASSES

### An Instructor by Trade, She's a Grandmother by Nature

To watch Mrs. Anne Howell conducting her refresher courses in electronic module welding and soldering you wouldn't know she is a grandmother seven times over.

Mrs. Howell, who works in Nortronics' Manufacturing Engineering at Hawthorne, is the only woman in the group with a technically oriented job.

She is certified by NASA to initially train and annually retrain each electronic assembly welder and solderer.

The work sometimes takes her from Nortronics to Northrop Ventura where the Apollo para-

chute system requires NASA certified welding and soldering. She is available, as well, to other Northrop installations.

But these are not Mrs. Howell's only tasks.

Within Manufacturing Engineering, she provides an interface between the electronic engineers who design the equipment and the people who must produce each assembly efficiently and according to the design.

Mrs. Howell consults with the design and manufacturing engineers on their requirements.

She inspects each prototype unit to make sure it is in its

most producible form. The manufacturing engineer and she develop the tooling and she builds the first four or five units herself.

In this way she can check for the most efficient sequence and methods of work.

The next step is to train an assembly solderer, and the two of them provide instruction for the remainder of the people who assemble the electronic components.

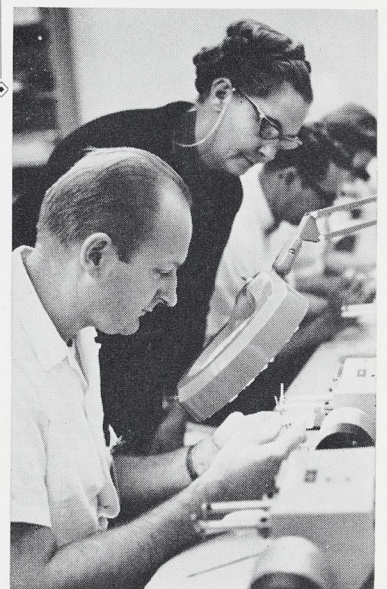
Even if Mrs. Howell didn't admit it, her 14 years with Northrop testify that she enjoys her work.

"I particularly like the training duties," she said. "I haven't met anyone in training I haven't liked."

"It's satisfying to help people with their work problems and give them little bits of information and the refinements you pick up after years in the same type of work."

Mrs. Howell's two sons both have worked for Northrop, Lee at Nortronics, including Voice Warning System, and Fred at Norair in the plaster pattern shop.

She herself has been with Northrop since 1951. She came with Nortronics when the Division opened its doors and worked for the Ventura Division at one time for less than a year.



Mrs. Anne Howell of Nortronics Hawthorne offers tip to Northrop Ventura's Louis Castagna during NASA refresher course in assembly techniques at Newbury Park.



## FRINGE BENEFITS

## Five Education Programs Keep People From Becoming Obsolete



By WILLIAM LARRABEE  
Vice President—Industrial Relations

I know of a company which did very well in the old days manufacturing and selling buggy whips. Since these were the very finest buggy whips, it is clear that a great deal of advanced technology and research and development went into the product and that the people on the assembly line knew exactly how to build them. As we all know, however, the motor vehicle put quite a crimp in the buggy whip business. It is doubtful that a buggy whip design engineer or assembler would now find much of a market for his talents.

Many of us tend to forget that exactly the same thing which occurred in the buggy whip keeps right on happening in every business every day. We don't have to look very hard to see it in our own field of work. Our industry's products of 20 years ago are just about obsolete.

Rosie the Riveter of World War II days is giving way to processes such as bonding. The electronic assembler is seeing more and more printed circuitry and microminiaturization. The conventional milling machine operator sees numerically controlled equipment all around him. The engineering talent which could tell us a few years ago how to design to those fearsome 300-mile-an-hour speeds isn't of much use in the fields of ballistic missiles and supersonic transports.

In law, in finance, in contract administration, in procurement, in quality control and, as a matter of fact, in just about every phase of our business the things that we knew 20 years ago are of constantly dwindling value in modern industry.

All of this means that people can become just as obsolete as buggy whip designers unless something is done to update their knowledge and capabilities. For that reason, any forward looking company makes educational programs available in all kinds of fields. Generally speaking, these are directed toward helping people to help themselves in this rapidly changing environment.

Northrop is no exception to the general rule and the educational opportunities which it offers Northrop people are tremendously varied in nature. There are five different kinds of programs. The first is called our "In-Plant Training and Educational Program" and is designed to offer courses on the premises where there is a sufficient number of interested people to set up a class.

These classes are also organized where there is a foreseeable need for training in view of the future introduction of some new tool or method which requires added skills. The courses are put

on by qualified instructors.

The next program, and one which is very widely used throughout the corporation, is the "Educational Refund Plan." A great many people attend school off hours in order to qualify themselves for more responsible assignments or to learn how to do a better job. The company picks up a good portion of the cost of these schooling programs.

In the area of higher education, the company has its "Graduate Study Program" which gives the candidates for advanced degrees at colleges or universities real incentive to go on with their education. There is also a "Resident Study Program" which provides for assistance in connection with full-time scientific or engineering study at the postgraduate level.

Last, there is the "Directed Attendance Plan" which provides for sending people, as part of their jobs, to short courses, seminars, workshops and university executive programs. Hundreds of these types of courses are given each year by government and industry in specialized fields to keep industry functioning smoothly in the light of rapidly changing conditions and ground rules.

Within these five programs the company offers real help to the individual who wants to keep up with the times. This does not mean that either the company or its people are doing enough. While hundreds of our people are now involved, all of us in management hope that the number using the programs can be increased substantially from year to year.

This can be done in two ways. In the first place, the company can do more to publicize its programs and to point up the need for continued education. It can help counsel people who want career development opportunity. Our divisional industrial relations people are being asked to put special emphasis on this work.

In the second place, individuals themselves can look around them and realize that to move ahead, or even to stand still, in these days of constant change requires increased job knowledge and a good look into the future. They can then do something about it by seeking the help of their Industrial Relations office.

There is a corporate directive (Corporate Policy Directive No. 15) which describes these various plans. Furthermore, each division has internal bulletins of its own supplementing the corporate directive.

We hope that when we look at our educational programs a year from now we will see them used on an even broader base.

## GI's Write Thanks For Gift of Pizza—'Most Missed Food'

A letter of thanks for a shipment of pre-cooked frozen pizzas to a Marine squad in Vietnam has been received by Northrop, which started the delicacies on their way earlier this month.

PFC James E. Halverstadt, son of Guy Halverstadt of Northrop's Palmdale facility, had written on behalf of his squad to the Boulevard Delicatessen and Liquor Store in Palmdale, where Private Halverstadt bought pizzas before being sent to Vietnam.

He told the manager, Robert Cundiff, that pizza was the most missed food among members of his squad and asked how the group might purchase a selection. Mr. Cundiff offered to supply the pizzas free if Northrop could arrange shipping transportation.

The results of the cooperative effort are evident in Private Halverstadt's letter:

"The fellas and I would like to thank you very much for your kindness and generosity in helping with the shipment of the pizzas . . . We didn't have the equipment to heat them, but made use of what was at hand . . . But no matter how we ate them they were good American pizzas and made 24 Marines very happy . . ."

## Last Call Sounded For Mexico Tour

March 28 is the deadline for reserving a seat on the NRC-sponsored springtime tour of Mexico April 29 through May 14.

A final organization meeting is set for 7:30 p.m., March 22 at the NRC Clubhouse, Hawthorne, and will include full details and a film report on Mexico.

Total cost is \$320 and includes jet air fare, hotels, sight-seeing and breakfast. The tour includes stops at Mexico City, Acapulco, Guadalajara and many other points of interest.

Contact Personnel Activities for information.



Ho-hum, another typical day in the life of a junior executive, says Christopher Ronald Schmitt, two-month-old grandson of George Schmitt of Norair's Property Management unit.

## Northrop to Assist Peace Corps Drive

Northrop will again cooperate with Peace Corps officials in conducting an in-plant recruiting program for qualified employees who are interested in joining the Peace Corps.

Arrangements have been made to conduct interviews with Peace Corps representatives at Northrop on March 31 and April 1. The Corps has enjoyed immeasurable success after four years of establishing itself as a significant tool for motivating self-help in emerging nations.

The list of job categories covers over 300 job classifications. Persons with training in math and science are in demand and persons with training in agricultural and farm backgrounds usually rank second. This does not exclude, however, a demand for carpenters, machinists, nurses and instructors.

A 25-month leave of absence will be granted successful applicants for the Peace Corps. Although tours are for 24 months, Northrop will allow an extra month for returning volunteers. This policy, which is included in the manual "Working With Northrop," provides for leaves of absence without pay. During such (See PEACE CORPS, page 5)

## JOHN FISHER JOINS MARKETING STAFF

# Defense Systems Advisor to Study Corporate Capability

John H. Fisher, an authority in both the United States and Europe on the technology and application of defense systems, has been appointed to the newly created position of Defense Systems Analysis administrator in the Corporate Marketing operation.



Mr. Fisher

A specialist in command systems for tactical operations, Mr. Fisher will be responsible for analyzing potential business to see if the use of capabilities of more than one element of the company would enhance Northrop's competitive position.

In this capacity he will serve as an advisor to Glenn R. Lord, Corporate vice president — Marketing. He will also advise Marketing in more general areas which might enhance the com-

pany's responsiveness to defense requirements.

"On some occasions there are defense requirements, particularly in the area of complete systems, to which a Northrop division or subsidiary cannot respond because of its specialized capabilities," Mr. Fisher said.

"However, it is possible that the technology lacking at one location may be available at another within the corporate network."

Although Mr. Fisher's personal responsibilities are in the area of defense requirements, he said that the Deep Submergence Systems Program (DSSP), of which Northrop is industry manager for the Navy, is an example of the success possible from a total company effort in gaining new business.

The deep submergence program, headquartered at Nortronics Anaheim, was a corporate proposal last year based on the total company capability. North-

rop is responsible for systems engineering support—software rather than hardware—for the five-year multimillion dollar Navy project (NORTHROP NEWS, March 2, 1966).

Valuable contributions to DSSP are being made by Norair and Ventura divisions, Northrop Space Laboratories and all of the Northrop Nortronics facilities.

Mr. Fisher came to Northrop from System Development Corporation, where he was on the staff of the vice president, Defense Systems Division. He joined SDC in 1957, when it was a division of the Rand Corporation, as an executive assistant.

During his stay with SDC he served variously as assistant to the manager of System Applications, leader of the 500-man group that installed SAGE computer programs at field sites throughout the country, assistant manager of the SAGE computer program project, and

technical assistant to the president.

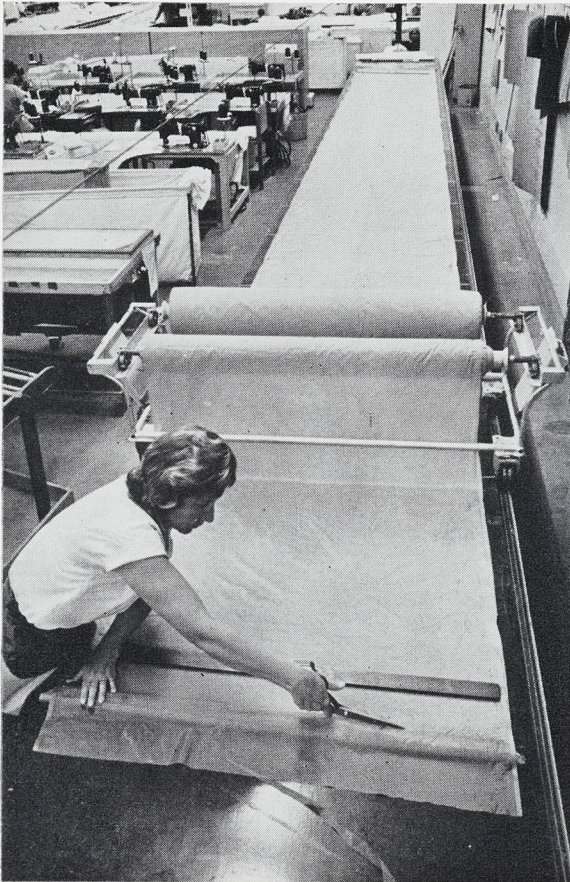
In 1962 he went on leave of absence from SDC to serve as air defense technical advisor to the U. S. mission to NATO. His assignment at NATO was to establish the manner in which the United States would contribute to the air defense system the organization intended to build.

In his service with NATO he met with foreign government officials and high-ranking civilians and military officers throughout the U. S. Government. He also conferred with officials of the Supreme Headquarters—Allied Powers of Europe (SHAPE), Military Assistance Advisory Groups, and executives of some of the major industrial facilities in Europe.

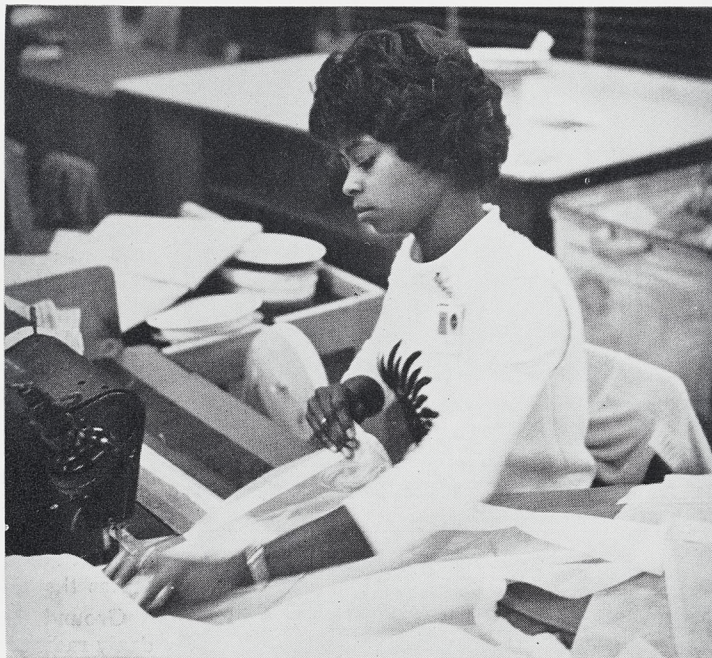
A graduate of Massachusetts Institute of Technology, he holds a bachelor of science degree in business and engineering administration from that school.

# If You Are Eligible for Medicare, Be Sure to Sign Up Now.





Nylon fabric for canopies of Northrop Ventura's Apollo parachute system must be laid out in layers before pieces are cut to match patterns. Nelly Cook (left) pulls material from bolts and trims it to convenient lengths before final cutting (right) begins. Sections of as many as four canopies are cut to match paper markers, which in turn duplicate original metal patterns. Below, Bobbie Taylor bastes tape into position before sewing of three-needle main seams.



### 3,300,000,000 STITCHES IN TIME

## Space Technology Is Not Altogether a Man's World

In 400 hours of sewing on one Apollo spacecraft main parachute, Ted Szostek's crew of Northrop Ventura seamstresses can expect to complete more than 33 million stitches.

Multiply the Paralab's work by some 100 main canopies completed to date and the figure already hard to comprehend defies understanding.

Alone, these statistics, reported to Mr. Szostek, head of the Paralab, have little meaning. But connect them with the high standards of quality necessary in assembling the Apollo parachute system and they take on considerable significance.

"We have our defects down to a bare minimum," Mr. Szostek reports, "even before NASA Quality Control inspectors get a look at one of our parachutes."

Examination of the parachutes by the in-process examiners, combined with rigid Ventura Division Quality Control inspection procedures, provide American astronauts with as great a safety standard as humanly possible.

Material for the parachutes is received at the Paralab, officially designated Parachute Experimental Fabrica-

tion, in 300- to 400-yard bolts 42 inches wide. Two different fabric weights, 2.25 ounces per square yard and 1.1 ounces, are used.

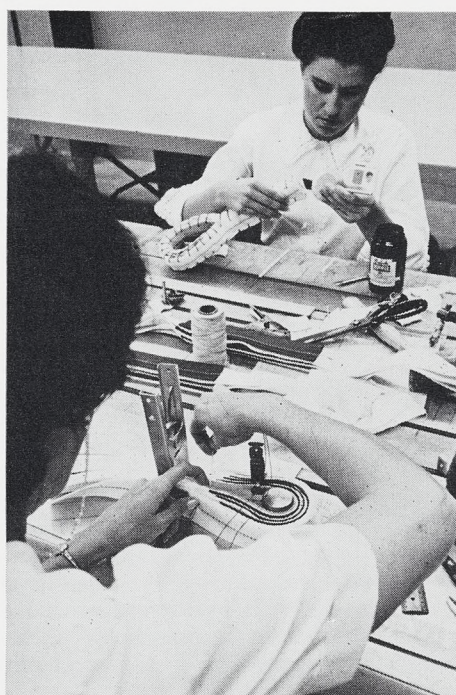
Four of the main parachutes are cut at one time. There are 68 gores to a chute, each made up of 12 sails. The canopy is reinforced with a total of 19 lateral tapes plus the vent and skirt band.

This is where all the stitching comes in. Some of the reinforcing tapes require as many as four separate rows of stitches, not including the basting necessary to hold the tapes in position on the edges of the nylon cloth for sewing.

The main parachutes are of the Ring-sail type, with the sails, or individual panels, separate from each other at top and bottom.

In portions of the main chute receiving high stress, on opening shock for example, both the leading and trailing edge of the sails are reinforced with nylon tape.

Usually 136 lays, or layers, of material are cut at one time, using paper markers matched to the master patterns.



Test samples are prepared as part of continuous effort to improve Apollo parachute system. Hilda Howard (right) whip stitches one sample while Joanne Bishop applies anti-fray solution.

One of the more difficult procedures in making a main canopy is sewing the main seams in which two 300-pound tensile strength tapes and the sail cloth are rolled into a French fell seam. Because eight thicknesses are involved, the sewing machine operator must guide the cloth and tape through by hand, with a special guide on the presser foot.

Normally, on a standard French fell seam where there are only four layers of thickness (just cloth, no tape) a folder is used on the machine. But with the tape which makes it eight layers, this is not possible.

Since the main parachute is almost 84 feet across, overhead rails and wires are used to hold the canopy in place conveniently during the work.

Main parachutes are not the only parts of the system made at the Northrop Ventura Paralab.

Drogues, pilots, retention flaps, deployment bags and nylon cord risers for all the canopies are also assembled there.

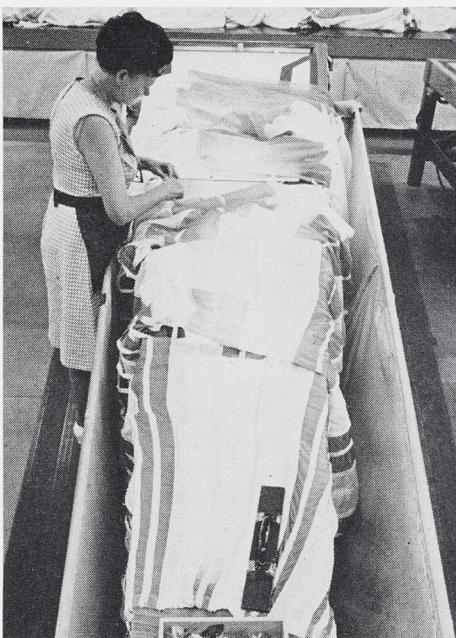
There are eight parachutes used in each Apollo parachute system, three mains, three pilots and two drogues.



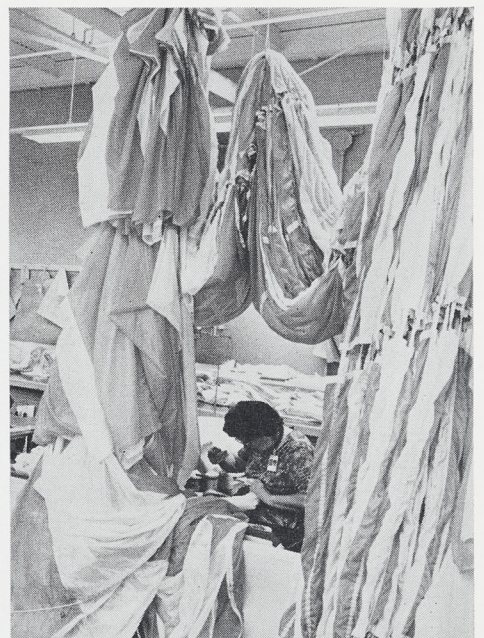
Next step after basting, three-needle seam sewing, requires two women, Celia Marquez (left) and Shirley Kennedy working as team. The two weights of material which are used are 1.1 ounces and 2.25 ounces per square yard.



Three seamstresses, from front, Celia Marquez, E. C. Parker and Darlene Shoemaker, work side by side on main seams of canopies. Edges of nylon fabric are special weave for added strength.



Seamstresses examine parachutes while they are being made, even before the formal Ventura, NASA, or North American Aviation inspections take place. Nelda Freymond checks three-needle main seam between gores of main canopy.



Overhead conveyor rails facilitate Mrs. Grace Shaw's handling of partially assembled canopy as she hand sews wraparound reinforcement on skirt for attachment of suspension lines. This is one of few items not sewn by machine.



## MORE THAN \$600,000 IN IDEAS



First Northrop Data Processing suggestion originators under the Cost and Management Improvement Program receive recognition for their cost saving ideas from Paul O. Wierk (fourth from left), Corporate director, Management Information, himself an idea originator. Recipients of CMIP lapel pins, desk plaques and certificates, some not in

photo, were Ed M. Piper, Ray Turner, Jack Slack, H. D. Hunt, Loren Nelson, Glenn W. Thornton, Arthur A. Phelan, Richard T. Miller, Spencer L. Manlove and D. J. Villegas. Men work at Hawthorne, Anaheim and Ventura. Department goal for fiscal 1966 is \$1 million. Savings to date this fiscal year exceed \$600,000.

## Where Outer Space Begins

In January 1963, a group of some 15 Northrop senior scientists and engineers came to Huntsville, Alabama, to establish the Huntsville department of Northrop Space Laboratories. From this modest beginning, Northrop Space Laboratories has become an active, on-the-scene participant in the aerospace industrial community in this Tennessee valley city where, as highway billboards acclaim, "Outer Space Begins."

Today, the Huntsville department employs approximately 300 people who are engaged in vital research and development functions for the U.S. Army Missile Command, NASA's George C. Marshall Space Flight Center (both located at Redstone Arsenal, Huntsville) and other elements of the aerospace industry.

General John A. Barclay (U.S. Army, ret.), manager, and Milton Beilock, assistant manager, head the management team at Huntsville. The department is divided into three functional areas: Staff, Project, and Technical. Plans and Programs and Business Administration units compose the Staff branch. The two project groups are the Lunar Drill Project and the NASA-MSFC Aero-Astrodynamics Laboratory Support Project. Functional entities in the technical area are: Research and Analysis section, Systems section, Experimental Operations section, and Cape Operations.

First home for Huntsville group was the Huntsville district office in the Holiday Office Center; later, as support requirements grew and the staff increased to 50 persons, office space was leased from Brown Engineering Company. In November 1963, the first unit of the company-owned headquarters was completed in Huntsville's sprawling Space Research Park.

The initial structure, with an attractive stone and glass exterior, contained 20,000 square feet of floor space. Expansion, which doubled the

available floor space of the original unit, was completed on Northrop's 42-acre site just before the yearend holiday.

Space Research Park, located within a few minutes drive of Redstone Arsenal and adjacent to the University of Alabama Research Institute and the University's Huntsville campus, is a 2000-acre industrial complex established in 1961 by the City of Huntsville.

Northrop's neighbors in the park-like development include IBM, Lockheed Missile and Space Company, Chrysler Corporation, Stanford Research Institute, Boeing, Dow Chemical Company, and Brown Engineering Company.

With the physical growth of the Huntsville department has come an appreciable growth in the scope and influence of its role in the aerospace activities in the Huntsville area. Support to MSFC's Aero-Astrodynamics Laboratory, which was one of Northrop's earliest relationships in the area, is continuing and it requires 56 persons located in the laboratory on Redstone Arsenal.

Currently, a large percentage of the more than 200 persons in the Huntsville department's main office are involved in the Lunar Drill Project and other important research and development studies.

More than 50 Northrop people are engaged in support efforts, through the Huntsville department, at Kennedy Space Flight Center at Cape Kennedy, Florida. Through its growth, Northrop Space Laboratories Huntsville department feels something of the pioneer's thrill as it forges into new technologies and accomplishments with all of Northrop.

One doesn't have to live in Huntsville for a lifetime to qualify as a pioneer, nor to say, "I remember when . . ." for the city itself is under-

(See HUNTSVILLE, page 5)

## F-5 Training Flight Turns Into 'Real Thing' in Greece

An American general officer and a Greek pilot on a training flight in an F-5B got a taste of the real thing recently when they intercepted four unidentified aircraft over Central Greece, it was reported in the Athens Daily Post.

The aircraft turned out to be friendly — four Italian Air Force RF-84F's en route home from an exercise — but the drill was real enough to Air Force Major General Harry L. Hillyard, chief of the Military Assistance Group in Greece, and Major Nick Artinos, commander of the 343 IDF squadron of F-5 fighters.

The two officers were on a familiarization flight to acquaint General Hillyard with air defense interception under radar control. Another F-5B was acting as the "intruder."

Ground Radar Control suddenly radioed the Northrop aircraft that an actual "unknown" had appeared on his scope. Major Artinos was asked to intercept.

Greece has received its initial shipment of F-5's under terms of the Military Assistance Program, and official ceremonies are scheduled for later this year.

## Mariner Work Leads To Fiction Thriller

Northrop work on the Jet Propulsion Laboratory's Ranger and Mariner programs has produced an unusual byproduct for Bill Ellern of Northrop Space Laboratories.

Mr. Ellern's document research at JPL led him to write a science fiction story entitled "Moon Prospector." It will appear as the cover story in the April issue of Analog Science Fact and Fiction.

This is the author's first work, making his batting average 100 percent so far.

A graduate in physics from Washington State University, Mr. Ellern has been at NSL for three years, two of these in support of JPL environmental systems testing for Ranger and Mariner. His current work is in sterilizable modules for a Mars landing vehicle.

## SPRAY BOOTH



Overhead conveyor permits rapid preparation of drone parts by Mick Lanning in Northrop Ventura paint shop spray booth.

## U.S. Savings Bond Interest Increased

Northrop participants in the U. S. Savings Bond Program will be recipients of a windfall by virtue of the recent increase in the interest rate of Series E and H U. S. Savings Bonds.

Effective December 1, 1965, Series E and H Bonds were increased to 4.15 percent from 3.75 percent. Bonds purchased since then will earn the new rate and it will also apply from that date to bonds bought earlier.

On Series E Bonds the increase will be accomplished by reducing the maturity date to seven years. Under the 3.75 percent interest rate, Series E Bonds matured in seven years, nine months. Thus, a series E Bond purchased now for \$18.75 will be worth \$25 when it matures in seven years.

On Series H Bonds, the increase will be accomplished by raising the amount of the semi-annual dividend sent by the Treasury to the bond holder. Series H Bonds are sold at par value and mature at the same value after 10 years, with interest paid meanwhile.

Application forms to participate in Northrop's U. S. Savings Bond Program can be obtained from Industrial Relations.

## NEITHER SNOW, NOR RAIN, NOR HEAT, NOR GLOOM OF NIGHT . . .



While Northrop-built F-5's sweltered in humid Vietnam on one side of the world, Northrop's leased F-5B (left photo) was carrying out demonstration program on snow- and ice-covered

eastern seaboard. Snow cleared from runways is piled high as F-5 taxis out for flight at Patuxent River Naval Air Station, Maryland. Demonstration was carried out last month de-



spite "great blizzard of '66" which left F-5 only jet aircraft operating from Patuxent River, one of nation's largest jet bases. In photo at right, U.S. Navy maintenance personnel observe re-

fueling of F-5B. Highly favorable comments were received on ease of maintenance, quick turn-around time for F-5.



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

**For Sale**

**Lot**, R-1, 8300 sq. ft., adjoining Santa Monica Fwy., \$14,750. West L.A., 473-1071. A

**Encyclopedia Britannica** w/bookcase & year-books, 1942-1961, \$175. Bellflower, TO 7-4362. A

**Tape Recorder** & playback sys., Sony model CS-300 stereo, carrying case, 2 microphones, \$200. L.A., AX 3-2354. A

**Mattress** & box spring, Spring Air, 1-yr-old, headboards & metal frame incld., \$100. Inglewood, 677-5705. A

**Ford Ranchero**, 1958, V-8, stick, r/h, 46,000 orig. miles, \$450. Torrance, 327-0272. A

**Corvair Monza**, 1963, r/h, \$1195. Box 501. A

**Bicycle**, boy's & 2 girl's, 26", \$20. Lawndale, OS 9-0876. A

**Surfboard**, 9'1" Lyman, new skag, \$45. Torrance, 375-6071. A

**Surfboard**, 9'1", Bing, \$80. Torrance, 325-4789. A

**Tires**, 5 6.70x15 4-ply. nylon, 3 are new, \$45. Hawthorne, OS 6-1345. A

**Sailboat**, 13' sloop rigged, fiberglass hull, centerboard, Romeo class, cartop carrying rig, dacron sails, access., \$375. Torrance, FR 4-4953. A

**Projector**, 35mm Tower, 500 watts, extra bulb & trays, used very little, \$62.50. Sherman Oaks, ST 8-9709. A

**Chevrolet Biscayne**, 1961, 6-cyl., auto. trans., r/h, \$650. Inglewood, 678-1621. A

**Motorcycle**, 1965 BMW, 500cc, 6500 miles, dble. seat, roll bars, windshield, luggage rack, \$1050. L.A., 939-7834. A

**Bicycle**, 3-spd., 1-yr-old, \$15. Hawthorne, OS 6-6463. A

**Arm Chairs**, blonde 2 Swedish modern, high-back, wood arms, \$40 ea.; \$75. Gardena, DA 9-9195. A

**Trampoline**, king size, cost \$175, \$50. Downey, TO 9-2700. A

**Pontiac**, 1957, 2-dr. sedan, auto. trans., radio, \$200. Hawthorne, 676-4879. A

**Boat**, Fiberglass, 15' Tel-craft w/40 hp Evinrude motor & Tee-Nee trailer, \$1200. L.A., OR 0-6896. A

**Home**, 3-bdrm., forced air heat, bltins, 9 miles from Douglas A-3, \$500 dn., \$14,500. Huntington Bch., 370-8036, 323-3856. A

**Olds Holiday**, 1956, 75,000 miles, \$175. L.A., 755-5507. A

**Corvette**, 1960 h/top, r/h, w/w, \$1200. Manhattan Bch., 379-8330. A

**Fairlane 500**, 1959, 4-dr., 300 hp, new tires & battery, r/h, p/s, \$295. Torrance, 371-7274. A

**Pickup**, 1957 Ford, ¾-ton, \$450. Manhattan Bch., 379-2649. A

**Tape Player**, stereo, Autostereo, chrome w/bracket, \$50. Torrance, 324-8789. A

**Boat**, 1963 17½' Glasspar Sun Liner, 2 35 twin Merc. outbds. less than 80 hrs. running, 2 12 gal. gas tanks, bait tanks, American trailer, seats 6, many other access., \$2500. Lakewood, TO 6-8977. A

**Dining Room Set**, Bassett solid walnut, table & 4 chairs, buffet & crystal cab., extends to 96" w/4 leaves, deliver up to 5 miles, \$100. Hermosa Bch., 372-6755. A

**Jaguar**, 1957, XK 140, new tires, brakes, body needs work, good eng., \$300. Manhattan Bch., 379-6762. A

**Hi-Fi stereo comps.**, AM/FM tuner, dual amplifiers, preamps & cross-overs, 4 speakers, stereo turntable, \$70. Hawthorne, 676-0418. A

**Stove**, Kenmore, 3 yrs. old, \$50. Hawthorne, 675-0407. A

**TV**, 21" Packard Bell console, maple cabinet, UHF, \$100. Hawthorne, OS 5-1847. A

**Home**, 2-bdrm., in Westchester, lge. lot, dble. gar., near schools, shopping, 5¼% FHA loan, low dn., \$23,850. L.A., 645-5169. A

**Rambler Ambassador 990**, 1963, 4-dr., b/seats, AM/FM transistorized radio, o/drive, posi-traction rear end, p/s, p/b, \$1350. L.A., 475-1497. A

**Captain's Chairs**, 8 Danish teak, \$80. Westminster, 714-897-0597. A

**VW**, 1961, set up for slaloms, Goodyear SP's, Porsche clutch, decambered, many extras, \$850. Fullerton, 871-4263. A

**Pups**, German shepherd, avail. about March 27, AKC reg., \$100. Hawthorne, 676-1441. A

**Metropolitan Museum Seminars in Art**, 24 vols. comp. w/288 color plates on sep. sheets, suitable for framing, orig. cost \$100, \$25. P.V. Pen., FR 8-1863. A

**Surfboard**, 9'1", redwood stringer, \$55. FR 5-0061. A

**Vacuum Cleaner**, Hoover, upright, deluxe, w/attachments, 2 yrs. old, \$55. Fullerton, 529-4788. A

**Falcon**, 1961, 2-dr. sedan, r/h, stick shift, \$550. Gardena, DA 4-7059. A

**Rifle**, Springfield, custom-built, flared maple stock, scope, \$175. Hawthorne, 674-8726. A

**Prinz**, 1959, sedan, good mileage, \$175. Hawthorne, 675-4505. A

**Sailboat**, 15' Sunray w/trailer & sails, \$200. Torrance, DA 3-2144. A

**Home**, 3-bdrm., 1-¾ baths, custom-built, deluxe built ins, lge. fenced rear yard, 2 miles from Northrop, \$28,000. Hawthorne, 675-8829. A

**Trailer**, teardrop, butane stove, ice box, 5-gal. water tank, pump sink, sleep area 48" x80", 3" foam mattress, attach. canvas sleeps 6, \$350. Inglewood, OS 6-8893. A

**For Sale**

**Watch**, Elgin Embraceable, waterproof, shock-proof, 19 jewels, in case, guarantee, \$100 value, \$40. Gardena, 327-0662. A

**Range**, gas, 37" Universal, white, hook-up pipes incld., \$25. Seal Bch., 430-3942. A

**Ford Station Wagon**, 1959, air con., all power, \$395. Westwood, GR 4-3433. A

**Porsche 1600**, 1959, conv., new paint, Michelin X tires, Blau Punkt radio, \$1650. P.V. Pen., 377-4268. A

**Bar Stool Set**, 4, maple, w/back, \$20. Redondo Bch., 372-8334. A

**Chevrolet Impala**, 1961, 2-dr. sport coupe, 348 eng., Power glide, p/b, p/s, r/h, safety belts, \$1195. Woodland Hills, 347-5327. A

**Station Wagon**, 1960, 4-dr. Falcon deluxe, r/h, luggage rack, Fordomatic, orig. owner, \$550. N. Hollywood, PO 6-3522. A

**Speakers**, 2 ea., 26" Hi-Fi, 8-celled., exponential horns, comp. w/driver units, freq. resp. 800-10,000 cps, impedance 16 ohms, p/rating 25 watts, \$30 ea. Redondo Bch., 379-4559. A

**Dog**, Weimaraner, 4-yr-old female, good hunting dog, has papers, \$150. Gardena, DA 4-7119. A

**Corvair**, 1961 Lakewood station wagon, auto., r/h, \$650. Venice, EX 1-2040. A

**Volkswagen Bug**, 1963, sunroof, \$1150. Long Bch., 596-1280. A

**Valiant**, 1961, 4-dr., r/h, big 6 eng., V-200, orig. owner, 26,000 act. miles, \$750. Lawndale, 676-3050. A

**Land**, 40 acres, near California City airport, \$375 acre w/\$2500 dn., 10 yrs. on balance, power, water. P.V. Ests., FR 5-4742. A

**Sewing Machine**, portable zigzag, \$50. Torrance, DA 9-9464, DA 7-8994. A

**Piano**, Starr console, mahogany w/bench, \$500-\$700 value, \$300. Torrance, 323-1698. A

**Trailer**, Travel 15' Travelerze, sleeps 8, stove w/oven, ice box, press. water tank, brakes, cost \$1695, \$1200. Gardena, DA 4-1593. A

**Stove**, Western Holly, dble. oven, griddle, \$75. Torrance, 320-4475. A

**Honda**, 1965, 305 Scrambler, 3000 miles, \$650. Redondo Bch., 370-0157. A

**Mobile Home**, 35', incl. Calif. cabana, knotty pine, completely furn., \$2995. Hawthorne, OS 5-8207. A

**Lot**, dble. interment, at Inglewood cemetery, \$650. Inglewood, OR 2-8468. A

**Playhouse**, 8'x10", 6' walls, 4 French windows, Dutch door, disassembles into 6 pcs., \$85. Anaheim, PR 4-2779. A

**House**, 3-bdrm., lge. water cooler, kitchen w/bltins, burch cabinets, bltin TV/Hi-Fi area, raised fireplace, 500 sq. ft. playroom/workshop attached to 2½ car gar., fruit trees, walking distance to shopping center, 20% dn., \$27,250. Alhambra, AT 4-5698. A

**Comet**, 1961, 4-dr., stick shift, \$595. Costa Mesa, 646-3725. A

**Volkswagen**, 1500S, 1964 sedan, low mileage, \$1675. Lynwood, 638-4954. A

**Apt. House**, 4-unit, Fullerton College dist., rental income \$620 mo., cash to 1st leaves \$304 mo. pymnt., \$58,500. Buena Park, TA 8-2857. A

**Outbd. Engine**, 5 hp Apache, \$70. Huntington Bch., 897-6992. A

**Pontiac**, 1963 Grand Prix, r/h, s/belts, 4 new tires, 30,700 miles, \$1995. Garden Grove, 539-6259. A

**Refrigerator**, Servel & stove, Kenmore, \$50 for both. Torrance, DA 5-3724. A

**House**, 3-bdrm., 1¼ baths, patio, planters, 50x150 lot, stove & refrigerator incl., Imperial Village, \$24,000. Inglewood, OS 5-6721. A

**Sofa**, 3-pc. sectional, med. brown w/bltin table, recently reupholstered, \$115. Hawthorne, 676-6625. A

**T-Bird**, 1957, orig. owner, 47,000 miles, \$1500. Eastview, TE 2-1684. A

**Saddle**, roping, rawhide tree, 14" seat, dble. rigged, \$55. Camarillo, 805-482-1725. A

**VW sedan**, 1962, sunroof, new w/w tires, r/h, new muffler, \$1100. Manhattan Bch., 379-1657. A

**House**, 3-bdrm., 20'x20' family rm., near schools, fwy. & Northrop, lge. fenced yard, \$23,750, Gardena, 327-2904. A

**Exec. Home**, 8 mos. old, 2400 sq. ft., fully carpeted, 3 bdrm. & den, 3 baths, 3 decks, split-level, in Los Angeles, near all free-ways, 10% down, \$35,900. Redondo Bch., 378-7116. A

**Cocktail Table**, 22" x 60", oval terrazzo top, \$15. Rolling Hills Ests., FR 8-2190. A

**Chevrolet SS**, 1962, auto. trans., h/top, p/s, p/b, 8-cyl., \$1300. Long Bch., GA 6-6274. A

**Land**, 20 acres, Antelope Valley, near Willow Springs, \$2000 dn., \$525 acre. Torrance, FR 8-1026. A

**Volkswagen** sunroof sedan, 1966, all extras, \$1900. Inglewood, 677-4134. A

**Chevrolet Nomad** station wagon, 1958, p/s, p/b, r/h, auto. trans., recent valve grind, new starter, radiator, newly replaced trans., \$425. P.V. Pen., 377-7241. A

**Oscilloscope**, 3", comb. inst. is a Marker generator accurate to .05% & sweep frequency oscillator, Gen-O-Scope made by Simpson, cost \$575, \$175. Buena Pk., UN 3-2769. A

**Surfboard**, Jacobs, 10'4", \$80. Hawthorne, 675-6486. A

**For Sale**

**Home** in Running Springs, 2-bdrm., lge. living rm., fireplace, sun porch, built-ins, all elec., trees, \$15,900. Wilmington, 834-4184. A

**Corvette**, 1956, 4-spd. B&M Hydro, 1963 327 eng., chrome wheels, \$600. Torrance, 320-7239. A

**Ford Falcon**, 1962, 4-dr. station wagon, stick shift, 101 hp eng., luggage rack, orig. owner, \$850. Lancaster, TH 2-5097. A

**Vacation Trailer**, 1955 Dalton, 15', butane stove & light, elec. brakes, comb. ice box & elec. refrig., \$575. Long Bch., 596-7605. A

**House Trailer**, 18' Oasis self-contained, water heater, shower, apt-size stove, butane or elec. refrig., 2 new truck tires & wheels, sleeps 5, \$1300. Hawthorne, OS 6-9914. A

**Truck Mirrors**, Coronado Mod. #601, stainless steel, \$10. Gardena, OS 6-3726. A

**House**, no down to Vets, 3-bdrm., split-level, 1½ baths, built-ins, double gar., 1 mile to ocean, \$20,000. Redondo Bch., 374-2433. A

**Boat Trailer**, for 12'-16' factory blt., adjust to any hull, full lights, \$50. Inglewood, OR 1-2058. A

**House**, 4-bdrm., family rm., 2½ baths, 1-acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

**Travel Trailer**, 18', comp. 14' cabana, shower, many extras, \$1475. Compton, NE 2-2905. A

**Range**, elec., coppertone, Westinghouse, 4-burner, terrace top, auto. oven, timer, \$125. Gardena, 324-0274. A

**Mobile Home**, 12' x 60', 2-bdrm., awning, carport, skirts & shed, take over pymnts. of \$92.50 mo. or \$5700. Torrance, 370-4101. A

**T-Bird**, 1956 h/top, recent o/haul, paint & tires, auto. trans., orig. owner, \$1275. Pac. Palisades, 454-2057. A

**Corvette**, 1963 Sting Ray, fastback, 4-spd. stick shift, spec. handling package, hvy. duty shocks, many extras, Vibrasonic AM radio, rear speakers, \$2800. Lawndale, OS 6-6818, OS 6-5425. A

**Surfboard**, Bing 9'9", T-band, \$65. Paramount, ME 3-2672. A

**Freezer**, 22 cu. ft. chest-type, \$100. Redondo Bch., 376-2068. A

**Chevrolet**, 1953 convt., stick shift, r/h, \$150. Torrance, 327-4585. A

**Pontiac Starchief**, 1955 h/top, V-8, r/h, rear speaker, 64,000 orig. miles, \$100. Gardena, 323-8429. A

Wanted to Buy

**Mercury Colony Park** station wagon, 1962, '63, or '64, w/air conditioning. Torrance, 324-2992. B

**Attachments** for Singer hand-type vacuum. Box 502. B

**Dog House**, used. Torrance, 323-9586. B

**Gun**, Colt 45 cal. 1911-A1 govt. issue, auto., top condition. Hawthorne, OS 6-6390. B

**Twin Bed set**, complete, spring & mattress, & 4-dwr. chest, reasonable. L.A., 750-6926. B

Rentals Offered

**Apt.**, single, 1-bdrm., living rm., kitchen, shower, util. paid, furn., near Northrop, \$60 mo. Hawthorne, OS 5-7371. E

**Studio Apt.**, front, 3-bdrm., 2-bath, pvt. patio, closed gar., near schools & park, children OK, \$165. Torrance, FR 5-0867. E

**Duplex**, 1-bdrm., furn. or partly furn., adults, extras, \$125. Hawthorne, OS 6-5464. E

**Apt.**, 1-bdrm., unfurn., near Northrop, \$75. Hawthorne, OS 9-7123. E

**Apt.**, 2-bdrm., gar. disp., built-in oven, \$115. Hawthorne, 679-1205. E

**Apt.**, furn., 1-bdrm., twin or dble. beds, no pets, adults only, \$80 mo. L.A., PL 3-8538. E

**Apt.**, 1-bdrm., unfurn., gar. 2 miles from Northrop, \$85. Hawthorne, 674-0755. E

Rentals Offered

**Apt.**, 1-bdrm., unfurn., garb. disp., refuse & water pd., child OK, walking distance to Norair, \$97.50 mo. Hawthorne, 676-1678. E

**Apt.**, 1-bdrm., built-ins & garb. disp., carport, trash & hot water pd., 3 min. to Norair, \$87.50 mo. Hawthorne, 679-6639. E

**Duplex**, 2-bdrm., w/wall heater 1 mile from Norair, close to schools, \$75 mo. Inglewood, PL 4-1611. E

**Apt.**, delux 2-bdrm., furn., lge. pool & patio, closed gar. & storage, near El Camino, \$135. Torrance, DA 9-5986. E

**Apt.**, lge. bachelor, furn., util. pd., 2-bdrm., unfurn., gar., 1 block from beach, \$80 & \$125-\$135. San Pedro, 831-6789. E

**Apt.**, 1-bdrm., unfurn., near school, shopping & beach, child OK, \$100 mo. Santa Monica, 393-8164. E

**Woman** to share home with same, \$65. 675-4998. E

**Apt.**, 1-bdrm. furn. & 2-bdrm. unfurn., upper, in 4-unit bldg., all elec., free wash & dry, closed gar. & sundeck, \$120 & \$140. Torrance, 370-4778. E

**Vacation Cabins**, Lake Gregory & Crestline, sleeps 6, \$25 weekends; \$60 week. Venice, EX 1-2040. E

**House**, 2-bdrm. w/attached gar., garb. disp., small yard, water & trash pd., \$110 mo. Hawthorne, 370-4494. E

**Apt.**, 2-bdrm., stove, built-ins, \$110 mo.; bach. apt., util. pd., 2 blocks from Norair, \$90 mo. Hawthorne, OS 6-7417. E

**Apt.**, 2-bdrm., pool, lge. patio, built-in gas kitchen, refrigerator, closed gar., \$115. Torrance, 323-1946. E

**House**, 1-bdrm., furn., den, sun porch, fenced, trees, water & trash pd., \$100 mo. Manhattan Bch., 372-6495. E

**Apt.**, 2-bdrm., 1350 sq. ft., unfurn., sub. garage, pool, blt-ins, 10 mins. to Northrop, \$127.50 mo. Lawndale, 679-2117, 670-6084. E

Child Care Offered

**Child Care** for 2-5 yr. olds, near Northrop, reasonable rates. Gardena, DA 3-0955. G

Lost

**U.S. 1 cent piece**, lge., date approx. 1853 in parking lot, sentimental value only, reward. Torrance, 325-5559. J

Personals

TO all my many wonderful friends throughout Northrop, a heart full of love & thanks for the generosity, expressions of sympathy & kindness extended to me at the loss of my husband. To my personal friends who knew Mac, I know they feel as I do that he was a joy to know. Again, my deepest thanks. ANN MAC CORMACK. L

**My thanks & appreciation** for your thoughtfulness during my stay in the hospital. RALPH E. MORGAN. L

**Learn to fly**, non-profit club has opening for student pilot. Hawthorne, 679-2635. L

For Sale or Trade

**Dining Table**, blonde ash, 4 upholstered chairs, \$35 or trade for good 4 or 5-dwr. chest & full-length door mirror. Lakewood, 633-2173. M

**Rifle**, Winchester semi-auto., 22 cal, 50 rounds old, \$45. or trade for 20-ga. pump shot gun. Lomita, 325-3376. M

**Home**, 3-bdrm., 1¼ bath, family room, 2 fireplaces, air con., 31' gar. w/dark room, block wall, sprinklers, \$38,500 or trade down for smaller home in Conejo Valley. Thousand Oaks, 805-495-7945. M

**House**, 4-bdrm., pool, 1¼ baths, FHA loan, low dn., \$14,500 or trade for land. Lancaster, WH 8-3912. M

Going my way?

Rides Wanted

7 a.m. — 3:45 p.m.

**Crenshaw & Torrance Blvd.**, Torrance. Lela Löve, Norair ext. 1834, 328-7234. 2

**Denker & W. 224th**, Torrance. Dennis L. Brashears, Norair ext. 2236. 2

Rides Offered

7:30 a.m. — 4:15 p.m.

**Gould Ave. or 26th St. & Hermosa Ave.**, Hermosa Beach. Penny Prouty, Norair ext. 1458, OS 9-6520. 3

**Highland & Marine**, Manhattan Beach. L. Berg, Norair ext. 2763, 379-6762. 3

Rides Offered

8 a.m. — 4:45 p.m.

**Pacific Coast Hwy. & Ave. I**, Redondo Bch. Connie Metcalf, Johnson Bldg. ext. 526, 378-7290. 5

Rides Offered

7 a.m. — 3:45 p.m.

**Denker & W. 224th**, Torrance. Dennis L. Brashears, Norair ext. 2236. 12

PEACE CORPS

(Continued from page 2)

leaves, seniority is retained but not accumulated.

**WHO MAY APPLY?** Any United States citizen over 18 years, provided he has no dependent children under 18. Married couples without dependents under 18 may apply if both can serve. There is no upper limit and Northrop retirees may apply.

**IS ANY SPECIFIC EDUCATION REQUIRED?** No, a college degree or high school diploma is not required. If accepted by the Corps, an applicant will be invited to a three to four month training course in the United States. Courses include language training, studies about nations abroad and a refresher class in American history.

**WHAT IS THE PAY OR ALLOWANCES?** All expenses—including travel, food, clothing, medical care, and incidentals—are paid by the Corps. Upon completion of two years service, a volunteer will receive \$1800, which is taxable, and a married couple will receive \$3600.

Employees interested in joining the Peace Corps should contact their appropriate Division Industrial Relations office before March 28. A schedule of interviews will be arranged with Peace Corps representatives and each applicant will be contacted individually as to the day and time of the interview.

HUNTSVILLE: A Growing Prosperity

(Continued from page 4)

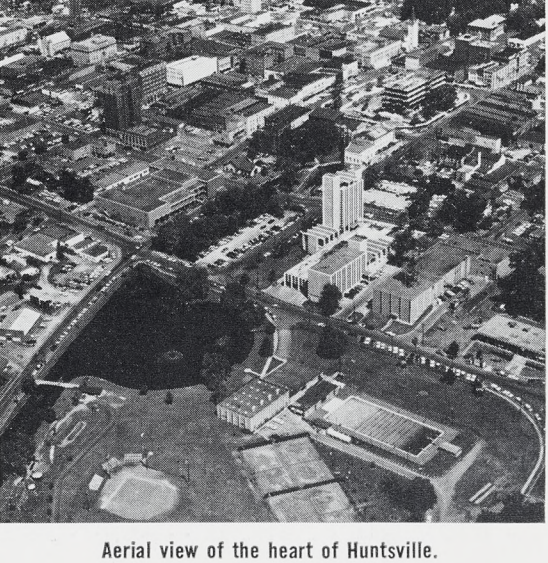
going continual change and growth. In 1950, the population of Huntsville was less than 17,000; a special census in 1965 placed the count at more than 139,500 (191,000 including Madison County in which Huntsville is located) and an estimate that a population of 200,000 could be anticipated by 1970.

With a population equal to that of Anaheim and Hawthorne combined (1960 census), Huntsville is now the second largest city in the state in land area; it is third largest in population.

Rapid growth has brought its share of problems to the City Fathers, but the problems are being attacked intelligently on every front by those rare creatures, native Huntsvillians, and people who have come to Huntsville as its aerospace industry blossomed.

Huntsville's claim to fame once lay in its ability to lead the state in cotton production, then during the 1930's as the "Watercress Capital of the World". In 1950, the Army transferred its group of missile experts to Huntsville from Ft. Bliss, Texas. The group included Dr. Werner Von Braun and his team. Eight years later, a

Huntsville built Jupiter C put aloft America's first satellite — along with it Huntsville's claim as the place "where outer space begins."



Aerial view of the heart of Huntsville.



## Craig AFB Gets T-38 Trainers, Is Ninth Talon Base

Craig Air Force Base at Selma, Alabama, became the ninth Air Training Command base to utilize Northrop-built T-38 Talon trainers this month when undergraduate pilot training began there. Colonel Richard L. Ault, commander of the 3615th Pilot Training Wing, flew the first T-38 to Craig in December to be greeted by military and civic dignitaries on hand to welcome in the "supersonic era of pilot training at Craig." A second T-38 arrived in January and joined the first in a maintenance training program.

Further deliveries began this month and will continue until approximately 80 T-38's are on hand for use there.

More than 570 T-38's are presently deployed by the Air Training Command. They have logged in excess of 600,000 flight hours and compiled a safety record unmatched by any supersonic jet aircraft in the Air Force inventory.

In addition to its role as an undergraduate pilot training aircraft, the T-38 is being used by NASA astronauts for part of their space flight readiness training and as a chase plane in test operations with advanced type aircraft at Edwards Air Force Base.

Northrop flew its first supersonic trainer, the YT-38, in April of 1959. The first T-38A flew in January 1960.

Randolph Air Force Base, Texas, received the first production T-38 in March 1961 and Webb Air Force Base, Texas, became the first undergraduate pilot training center to get T-38's in November 1961.

At intervals of roughly six months, the other Air Training Command bases began receiving T-38's. Williams Air Force Base, Arizona, received Talons in June 1962.

The following Air Force bases received T-38's in this order: Reese (Texas) in January and Vance (Oklahoma) in August of 1963; Moody (Georgia) in March and Laughlin (Texas) in September of 1964; and Laredo (Texas) in April 1965.

Aircraft assigned to Webb AFB passed the 100,000-hour flying mark in December 1965, just six months after all Air Training Command planes passed the 500,000-hour mark.

## 225 NORTHROP YEARS



Nortronics Management Club recently and their wives, for completion of 25 years of work with Northrop. Frederick Stevens, Northrop vice president and Nortronics general manager, presented each with service pin and certificate. From left, are Earl Tripp, Max Warren,

John Baker, Mr. and Mrs. Oscar Gumpett, Mr. Stevens, Mr. and Mrs. Richard Clarke, Mr. and Mrs. Chester Druliner, Mr. and Mrs. John Cummins, Mr. and Mrs. William Robusch, and Mr. and Mrs. William Byer.

## UNIQUE SITUATION AT VIGICON SITES SPURS WILKINS

If Dick Wilkins of Nortronics Product Support could be at Quonset Point, Rhode Island; Andros Island, the Bahamas; San Diego, California; and Edwards Air Force Base, California, all at the same time, he'd be an ideal employee.

John O'Connor of Field Service reports that, in a unique situation, four widely separated users of Vigicon display systems had requested simultaneous final adjustments of the systems so they could become operational. Normally, the requests would come at different times during the year, Mr. O'Connor said.

Mr. Wilkins is the only man assigned to perform the final calibration of Vigicon systems. He has already started on the Quonset Point display system and will complete the others this month.

The Quonset Point Vigicon was delivered last spring for use in anti-submarine warfare training. The Navy's San Diego Anti-Submarine Warfare School received their system July 1965.

The real time display system at Andros Island, delivered in November 1965, is at the Navy's Atlantic Underwater Test Evaluation Center.

The fourth system was delivered to NASA last month at Edwards Air Force Base for use on the X-15 program.

Vigicon is a product of the Space and Information Systems section at Palos Verdes.

## DRILLING: DSSP Technology Applied to Offshore Oil Operations

(Continued from page 1)

ing both the technical and economic feasibility of such a program.

Probably the most interesting aspect of Mr. Danforth's study is related to his "man-in-the-sea" concept and life support technology.

While automation is becoming a byword of the oil business, it will be many years before a drilling operator can be replaced, Mr. Danforth indicated. The operator controls rate and speed of a drill by "feel" and a quick, instinctive reaction is required as the drill bit breaks through one stratum into another.

Consequently a suitable habitat must be developed for underseas workers, Mr. Danforth said.

The author, who has extensive experience in underseas activity both with the Navy Bureau of Ships and Northrop, urged simplicity in design of the working and living habitat so that experienced oil workers could move into a new environment with a minimum of training.

He cited nearly a score of man-in-the-sea experiments, including the Office of Naval Research Sealab program and Captain Jacques Cousteau's Conshelf series, which are providing knowledge of man's functional capabilities in the deep sea environment, as well as high degree of sophistication in architectural design.

The author proposed a 28-day work cycle for drilling crews, in-

cluding 14 days working in the submerged platform, 2 days decompressing before returning to the surface, 11 days off the site and 1 day preparing for descent again.

A typical working day would consist of 8½ hours on duty followed by a 3½ hour rest period, 3½ hours more work and finally 8½ hours of sleep.

However, as "man-in-the-sea" is only one aspect of the Nortronics Deep Submergence Program, so it was in Mr. Danforth's proposal.

The DSSP at Anaheim covers four operations: recovery of survivors of marine disasters; creation of underwater bases where divers may live and work; recovery of large ships sunk below the ocean surface; and the development of a submersible manned vehicle which could recover aerospace components and conduct oceanographic investigations at a depth of 20,000 feet.

Despite the massive effort which went into the study, Mr. Danforth cautioned that his paper was intended "to serve as a point of departure to indicate the broad areas of design and development involved with any undersea oil drilling operation."

## COMMISSIONERS SOUND CALL FOR SUMMER BOWLERS

The first sounds of summer echoed in the Hawthorne area this week as NRC bowling commissioners issued their first call for summer league bowlers.

Action gets under way during May. Entry forms are now available through Personnel Activities outlets.

Popular summer mixed four-some loops are now scheduled for Monday at Tropicana, Wednesday and Thursday at Missile and Thursday at Southwest. A men's scratch trio will meet Tuesday at Missile and a mixed trio Peterson point loop will be held at Gardena on Thursday. Swing shifters will invade Tropicana for either mixed trio or mixed double league each Friday.

Potential leagues under consideration are a ladies double or trio loop, scratch or handicap, and a mixed trio or foursome in the South Bay area.

## Hawthorne Golfers Announce Winners

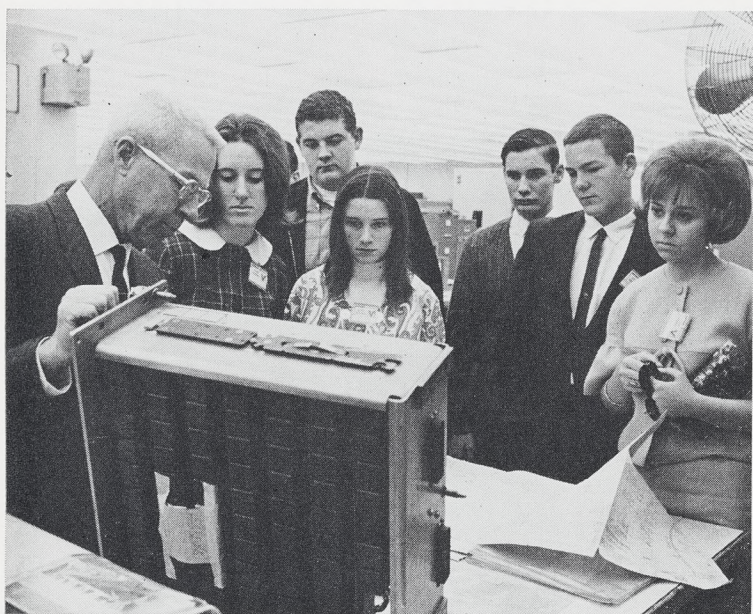
Elmer Noonan, Roy Jackson, Jim O'Neill, Phil Fox and Jim Mounts were winners in each of four flights February 19 when Nortronics Hawthorne golfers played the Massacre Canyon Inn course.

Mr. Noonan's and Mr. Jackson's net 71 topped Ed Stone (73) in the first flight; Mr. O'Neill shot a net 69 to beat Warren Lindsay (71) and Nils Johnson (72) in the second flight; Mr. Fox had a net 69 to pace Lou Villaba (71) and Joe Horst (72) in the third flight; and Mr. Mounts' net 68 bettered Robert Whitman (72) and Roger Shilling (73) in the fourth flight. Dick Wood won low gross with 83.

## Tie Develops During Anaheim Tourney

Harry Thompson shot a net 71, three strokes better than Bob Yarbrough's net 74, to win first flight honors in the NRC Anaheim golf tournament held February 26 at the Rancho San Joaquin Country Club.

Hal Withee and Bruce Miller tied for first in the second flight with net 72's. Thelma Watson copped ladies' laurels with a net 73.



A LOOK INSIDE ELECTRONICS—Cy Seeley (left), an advisor for Trivco, Junior Achievement firm sponsored by Nortronics Anaheim, shows visiting firm members intricate workings on electronic drawer unit. Youngsters made tour of Anaheim facilities, enjoyed lunch and saw special films during annual visit last month.

## CODE WRITER

(Continued from page 1)

In explaining the need for such a system, Mr. Redwitz said that a typical reconnaissance mission might involve up to 5000 photographs. The problems in titling and describing all of these photos by manual methods are obvious, he added.

The present program, under a feasibility contract from the Photographic Management Division of the Navy Bureau of Weapons, is designed only to demonstrate a principle, Mr. Redwitz said.

"It is feasible, however, that the lamp assembly could be miniaturized to a package small enough to fit in the palm of my hand."



NDC-1050A computer passes acceptance tests administered at Nortronics Hawthorne by Art O'Leary (left), computer design specialist before delivery to Detachment 1, Air Force Avionics Laboratory, Holloman Air Force Base. Observers were Major Bob Plank (center) of Detachment 1, and C. E. "Doc" Turner of Defense Contract Administration Services regional office. William J. Whitesall and Jim Chin from Detachment 1 also saw acceptance procedures.



# NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California

Vol. 24, No. 6

March 30, 1966

## Referral Plan Amended for Fast Payment

A major change in Northrop's Employee Referral Award Plan will mean quicker payment to Nortronics personnel who qualify.

It calls for immediate processing of awards in lieu of a 90-day waiting period.

The opportunity for utilizing this plan to earn extra cash and at the same time perform an important service to Nortronics has never been better. New programs such as the C-5A guidance system and tactical reconnaissance

(Photo on page 8)

and intelligence systems have created many job openings, some critical in nature, for skilled engineering personnel.

Briefly, the plan calls for the payment of awards of either \$100 or \$200 to employees who refer individuals who subsequently join Northrop to fill jobs within specified classifications.

For instance, \$200 awards are now available for referrals in no less than 11 classifications, including engineering specialists, senior engineers, research engineers, scientists, intelligence systems specialists. Awards of \$100 are available for referrals of engineers, intelligence systems analysts, engineering programmers and senior designers.

Elmer Noonan, Nortronics director of Industrial Relations, notes the Employee Referral Award Plan has been highly effective in the past in filling critical job openings.

"Nortronics personnel can speak with authority on what Northrop has to offer in career advancement and its many benefits," Mr. Noonan said, "and they know best the type of individuals we seek for long-term employment."

To qualify for a referral award Nortronics personnel must take

(See REFERRALS, page 8)

## WELCOME ABOARD GENTLEMEN



Vice Admiral L. P. Ramage (right), commander of the U.S. Navy's First Fleet, and Rear Admiral A. S. Goodfellow, commander of Cruiser-Destroyer Flotilla Nine, are welcomed at Nortronics Anaheim after arriving at that facility via helicopter for TEAMS demonstration. Greeting committee included (from left) Jim Norman, Advanced Auto-

mation Systems Programs manager, Frederick Stevens, Northrop vice president and Nortronics general manager, and Frank Lynch, Nortronics vice president and manager of Operations. In right background is Lieutenant R. Comer, USN, flag aide.

## Employee Contest Names New Drone

Chukar is the name selected for Northrop Ventura's latest target drone, the turbojet-powered NV-105.

The name was submitted by John J. Lawrence, supervisor of the Mechanical and Structural Design branch, during a division-wide naming contest that started in February.

The original Chukar is a type of partridge, a wily bird that lives in the drier mountain areas of California and Nevada and gives expert hunters fits.

Mr. Lawrence's prize for suggesting the winning name is a \$100 United States savings bond.

The Chukar NV-105 drone is a variable speed, medium performance target for surface-to-air gunnery and missile system training.

## From Hawaii to Germany, Tech Reps Are Rare Breed

In today's hep jargon he would be called a rare breed of cat.

He is not an engineer; plays no part in basic research and development; has nothing to do with the procurement or utilization of raw materials; does not fabricate hardware, assemble components or engage in other production ac-

(Photos on pages 4, 5)

tivities; and practices his trade many miles from the home plant.

Still this unusual man, this rare breed of cat, shoulders responsibilities seldom assigned to an individual for he must, in a sense, answer directly for all of these functions and others too.

He is known as a field service

engineer or, more formally, as a Contractor Technical Representative. He's usually called a Tech Rep.

At Northrop Nortronics, where infinite care is exercised in his selection and training, he is considered a valuable asset.

The very basics of his assignment — to advise, assist and instruct the customer in the operation and maintenance of Nortronics products — contain some hint as to the importance of his job.

"These men are on the spot when our products are deployed in operational use and each day contact customer personnel from commanding officers to technicians," said R. L. Gibney, Nortronics director of Product Support. "In their actions and capability is reflected a distinct image of Nortronics and its products. They represent each of us."

In 1959, when the first Polaris submarine was on the ways at Groton, Connecticut, the first of the current group of Tech Reps reported for duty. Currently, there are 27 Tech Reps from Nortronics assigned across the United States, from Hawaii to New London, Seattle to Cape Kennedy, as well as overseas — in Scotland, Spain, Germany and Guam.

The majority continue to work with the Polaris missile program automatic test equipment designed and manufactured at Nortronics. However, some work with special computer systems and other programs at Nortronics.

What kind of man is he, this rare cat who works at home and abroad, serving many masters on behalf of Nortronics?

(See TECH REPS, page 8)

## Tracking Ship 'Twin Falls' To Use SINS

Northrop has received an award of \$853,000 from the Navy Bureau of Ships for a ship's inertial navigation system (SINS) to be installed aboard the USNS Twin Falls, an Eastern Test Range missile tracking ship.

This is the third navigation system which Nortronics Division has built for the range vessels, bringing the total contract up to \$2,385,000. The two previous systems are now operational aboard the USNS Vandenberg and the USNS Arnold.

The improved, compact Northrop systems are being installed as replacements to those currently aboard the ships to provide precise stabilization to the ship's tracking radar and improve navigational position referencing.

Designated Mark IV SINS, the new systems incorporate an inertial reference unit designed and built by the Massachusetts Institute of Technology.

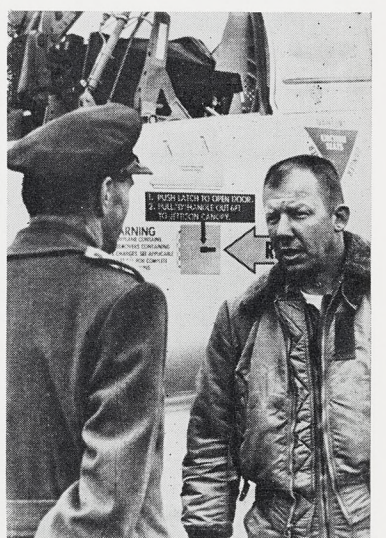
The Mark IV's are one-fifth the volume and one-third the weight of the original navigation systems aboard the tracking ships, and can pass through normal shipboard accesses and watertight compartment doors without disassembly.

## Service Pins Go To 15 Employees

Northrop service pins recognizing the completion of 10 and 15 years of service went to 15 Northrop Nortronics employees in West Coast facilities during March.

Fifteen year pins went to Clyde Bartlett, Knox Johnson, Harold Krabbe, Eugene Kennedy, William Blakeney, and Garner Regan.

Receiving 10-year pins were Virginia Paton, Ernest Reusch, Marion Grundy, Paul Sanford, Royce Wright, Paul Dudley, Glen Fuller, Agnes Kunhart and Dolores Schaefer.



Lieutenant General Wilhelm Mohr (left), commander-in-chief of the Royal Norwegian Air Force, greets U.S. Air Force Captain John Potter, mission commander on the recent delivery flight of 11 Northrop F-5's to Norway from Edwards AFB.

## GAGON HEADS TORRANCE STAKE

## Church Official Sees Chapel Dedicated

When the Torrance stake, Church of Jesus Christ of Latter-day Saints, dedicated its new chapel and community center early this year, Roland Gagon looked on as more than just a member of the Mormon Church.



Mr. Gagon

In his lifetime of membership in the LDS church he has watched the wards within the stake grow and split into the present seven.

He presides over all these wards: Palos Verdes, Rolling

Hills, San Pedro, Lomita, Torrance, Wilmington and Redondo.

Mr. Gagon has served the stake as president for seven years. Before that he was bishop for two years. He also has held office as high councilman (to the president) and bishop's counselor as well.

"In our church," he explained, "the offices are appointive. A man may be stake president one year and may be called the next year as a teacher or scoutmaster."

President Gagon's role is one of an administrator, but with both religious and secular obligations. His office makes him an interface between the religious leaders of his stake, the bishops, and the central administrator of Mormonism, the first president in Salt Lake City, Utah.

"My position as president," Mr.

Gagon said, "may not be as difficult as it seems. I have behind me every one of the 6000 people in the stake."

"In our building project, for example, most of them assisted financially and donated their labor toward its completion."

At Nortronics his responsibilities have included mechanical design supervision for Mark IV SINS, Ship's Inertial Navigation System, and FLIP, Floated Low-cost Inertial Platform.

He has been connected with most of the inertial platforms developed by Northrop since the 1940's, usually in a mechanical design capacity.

Mr. Gagon was recently elected vice president of Nortronics Management Club for the current year.



## FRINGE BENEFITS

## Benefits in Perspective: A Well Balanced Total Program



By WILLIAM LARRABEE  
Vice President—Industrial Relations

I have been writing about our fringe benefit program since early last October. There are lots more interesting benefits to talk about but we may not get to them for the next few issues. I am going to be away for a few weeks beginning at the end of April and this means, of course, that there are a thousand and one things to do before that time.

Among other things, we have been working very hard with our actuaries and brokers to get out our new plan of retiree insurance and to develop a revised program for our employees and dependents over 65 years of age. All of this is necessary because the Medicare plan is getting close and we must have something which does not duplicate what Medicare provides. We will, therefore, cancel out that part of our program which involves the same protection which Medicare provides and will supplement the Medicare program with some additional coverage.

We will also have a different plan for our retirees under age 65 and their dependents under age 65. All of this takes a lot of work in order to make sure that we get the best results. It looks now as if the whole program could be published in the next issue of the Northrop News.

Just one final last minute word on this: **LET'S MAKE SURE THAT ALL OF US AND EVERYONE WE KNOW WHO IS ELIGIBLE FOR MEDICARE SIGNS UP FOR BOTH THE HOSPITAL AND DOCTOR'S COVERAGE BY MARCH 31.**

There will not be any Northrop protection for eligible people for the same things covered by Medicare after Medicare is effective. It would obviously be silly for all of us to be paying for the same thing twice.

Before leaving fringe benefits for a little while, it might be well to take a look over what I think is a basic point of the articles written so far. As I said in the very first discussion on this subject back on October 6, 1965, the value of a fringe benefit package lies in its balance and the way it satisfies the various needs of our people at Northrop. That first article pointed out that we do not require

a world's record in any event but we want a fine record across the board.

A favorite technique of someone attempting to criticize a program is to single out one outstanding item in another company, give it a big buildup and attempt to convey the impression by so doing that the grass is much greener on the other side of the street. These critics forget to mention that some other benefit may be missing or inferior at this same other company.

Without half trying anyone can find some one thing which is better at one company than at another. No one company could afford to take the top benefit from each other company and still stay in business. If a company puts out too little, it will never keep its people, and people are the foundation of a company's success. If a company puts out too much and loses its competitive position it will not need any people because it will no longer be in business.

Possibly the best thing about Northrop's program is that it is designed by Northrop people for Northrop people. Those who work on it live with it and constantly exercise their ingenuity in order to figure out ways of doing things better. We have "Northrop firsts" and some benefits that are out of the ordinary because we think ahead and because our people want them. We will always endeavor to continue with an outstanding balanced fringe benefit program for ourselves and our company.

One further thing which keeps us constantly working in our studies of fringe benefits is the fact that they change so rapidly. In the last 20 years salary and wage costs in industry have climbed by 221%. In the same period, corporate welfare and pension outlays have shot up by more than 1300%. New types of benefits show up every day. New elements are cranked into our calculations all year long.

All in all, fringe benefits are of deep concern to all of us and are a fascinating subject for study. As time goes on they will be even more important and you can be assured that your Northrop Industrial Relations people will try to be just as much out in front with their thinking as they have been in the past.

## WITHHOLDING TAX CHANGES TAKE EFFECT MAY 1

A new system for withholding Federal income tax from wages will go into effect May 1, 1966. Prior to that time each Northrop employee must take certain steps to comply with the new law.

This is not a tax increase. The individual's yearend tax liability remains the same. The new system merely introduces new withholding rates which more closely approximate the rates upon which the yearend liability is based. It is, in a manner of speaking, more in line with the pay-as-you-go concept.

For instance, some Northrop employees will find the new rates are actually lower than those now in use. Others will note little difference, while still others face an increase in weekly deductions.

Early next month Northrop paymasters will distribute new Withholding Exemption Certificates (W-4 Forms) to each employee along with a government-provided document explaining the new system. Employees must complete the W-4 Form immediately.

More detailed information on the new system and how it affects each individual employee will be carried in NORTHROP NEWS, April 13.

## Las Vegas Weekend On Tap April 15-17

An all-Northrop "Las Vegas Weekend" has been planned for April 15-17 by the NRC Inter-divisional Travel Club.

The cost is \$32.50 and includes round trip bus fare, two nights at the Hacienda Hotel (two per room), two brunches, one buffet dinner, one show with cocktails, a champagne party and five free gaming chips.

Departure will be at 7 p.m., April 15 from Norair, with a pickup at Anaheim. Return will be at 3 p.m., April 17.

Reservations must be made by April 5 with Personnel Activities offices throughout Northrop.



Another segment of electronic engineering technology courses completed, Milo A. Thomas, development laboratory technician, (right) receives congratulations from Dick Shewmaker, his boss and supervisor of Engineering Test Laboratory at Northrop Ventura. Mr. Thomas has been studying by correspondence with Capitol Radio Engineering Institute of Washington, D.C., for some three years, with support from Northrop Education Refund Plan.

## Beverly Hills NSA Has Executive Night

Beverly Hills Chapter of the National Secretaries Association (International) held its first annual executive night at the Louis D. Statham residence, Holmby Hills, with Mrs. Virginia Burkhardt of Northrop assisting in the arrangements.

Mrs. Burkhardt, secretary to Frank R. Smith, Corporate director of Industrial Relations, assisted Betty Strohm, executive secretary to Mr. Statham. Miss Strohm was chairman of the February 16 event.

The annual gathering was held as a tribute to the executives for whom the secretaries work.

## April 14 Is Last Day For Voter Registration

April 14 is the final day for registering to vote in the upcoming California Primary Election.

In the interest of good citizenship, Northrop personnel are urged to exercise their individual rights by registering to vote and then casting their ballot for the issues and candidates of their choice.

## IT'S 'CON COP BAY NHO'

# Shrill Whine, Deafening Explosions, Oblivion for Viet Cong

It is four o'clock in the morning somewhere in the teeming jungle north of the Da Nang Air Base in the Republic of Vietnam.

Without warning, a shrill whine rents the sky and a needle-nosed aircraft streaks across the lush landscape raining death and destruction on Viet Cong hiding below.

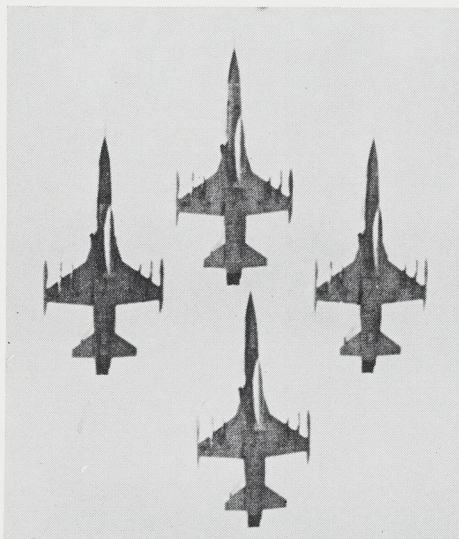
Deafening explosions, punctuated by shrill screams and muffled curses, break the early morning silence. One by one, seven more of the tiny planes race by, each adding to the holocaust.

Now there is silence once again. But only for a moment. Across the compound a cleverly camouflaged truck roars to life and the stillness is broken by the sound of its tires crunching across the rubble of what was once an orderly military supply complex.

Skidding to a stop in front of a small wooden building that somehow managed to escape the raging inferno, it disgorges a slender young man, not more than 22 years old. He is dressed in baggy black pajamas.

His face contorted with mixture of fear and rage, the young man races into the shack, picks up a small radio trans-

*EDITOR'S NOTE: Released March 12 in Saigon by the U.S. Air Force Second Air Division, this article looks at the effectiveness of Northrop F-5's in Vietnam from an unusual viewpoint—that of the enemy.*



This striking photograph of four Northrop F-5's moving into formation above DaNang Air Base in South Vietnam was taken at beginning of recent strike mission with the planes fully armed.

mitter and frantically twists dials in a vain attempt to contact his superior.

In the distance the aircraft climb in a slow, lazy turn and streak back towards their objective. Dropping down to a little more than treetop height, they rip through the sky intent on but one thing — complete destruction of the buildings below.

Five hundred feet below, the frantic officer has finally reached someone. It is his advisor, located some 50 miles to the north. He barely has time to say a single phrase before a slow, twirling bomb crashes through the roof of the hut and blows him into oblivion. The single phrase he utters is "con cop bay nho."

"Con cop bay nho" — "the little winged tigers." This is the name that even the most hardbitten Viet Cong has chosen to give Air Force pilots of the 4503d Tactical Fighter Squadron and their F-5A Freedom fighters.

Capable of delivering more than three tons of death-dealing armament in a single sortie, the Freedom Fighters and their F-5A Freedom Fighters.

Since arriving in Vietnam in late

October, they have accomplished more than 2500 sorties against the Viet Cong. Comprised of 20 pilots plus maintenance support personnel, the squadron has been continuously testing the F-5A in a combat environment.

Their tests fall under project "Skoshi Tiger" — a combination of English and Japanese words meaning "Little Tiger."

The Skoshi Tigers were originally formed at Williams AFB, Arizona, last July. Although all the pilots were drawn from Tactical Air Command resources, maintenance and support personnel were drawn from a total of nine commands and 73 bases.

In addition to the men of the fighter squadron, a separate evaluation team was also formed which travels with the unit to evaluate test results.

While they have set forth impressive credentials, it is doubtful that the Air Force's Skoshi Tigers will be content to rest on their laurels.

They have fighting spirit and "esprit de corps".

Viet Cong will know the meaning of fear so long as they look up and see "con cop bay nho" — the Air Force's "little winged tigers."



## C-5A MODEL PRESENTED



W. A. Pulver, president of Lockheed-Georgia Company, presents a model of the C-5A to T. V. Jones, chairman of the board and president of Northrop Corporation, at Marietta, Georgia, in commemoration of the award to Northrop Norair of the C-5A navigation system contract. Announcement of the award came last month, and work on the system is currently under way at Northrop Hawthorne.

## Space Congress Hears Plan For Flyby of Asteroid Eros

A manned flyby mission to the asteroid Eros could be of major benefit to the United States space program, Eugene A. Smith, a member of the Northrop Space Laboratories technical staff, believes.

In a paper presented during the Third Space Congress in Cocoa Beach, Florida, March 7 to 9, Mr. Smith said such a mission is feasible and within this country's capabilities.

His paper covered space missions, propulsion and vehicle systems, life support, asteroids, and pure mathematics.

"The over-all cost of the Eros mission," Mr. Smith reported, "should be well below that of other manned planetary flights because of extensive use of developments from other programs (including Apollo) and lower propulsion energy requirements than manned flights to Mars or Venus."

Eros is an irregularly shaped, elongated asteroid about 15 miles long and 5 miles wide. It will pass within 14 million miles of earth in January 1975, which by astronomical standards is very close.

A mission to the asteroid is "significantly less demanding,"

the author said, "than such interplanetary missions as Mars and Venus manned flybys."

"By 1975," he said, "a manned mission to Eros could, in addition to satisfying scientific objectives, provide invaluable experience for the more difficult manned planetary flights."

Close examination of asteroids would help explain their origin and would provide much general information concerning the solar system.

The asteroids and satellites, as well as other bodies in the solar family, are potentially valuable for exploitation. In space missions of the future, use of extraterrestrial resources, such as water and hydrogen, will become not just a possibility but an economic requirement, Mr. Smith feels.

In addition, he reported, the lesser bodies of the solar system are important components of interplanetary "weather," especially as related to manned mission hazards.

Flights beyond Mars, for example, will encounter the belt asteroids.

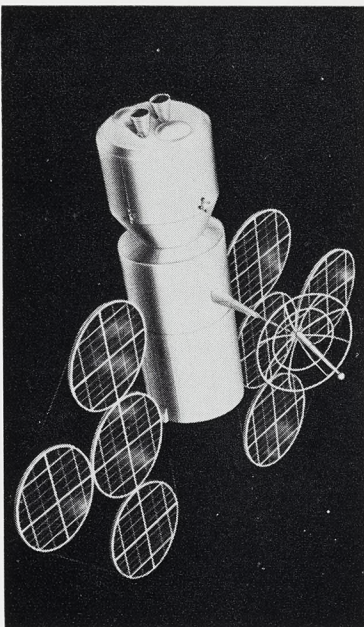
### Hakes Joins NASA Reps in TV Show

One of the most comprehensive and interesting television programs viewed locally recently was the March 15 (also repeated March 18) Aerospace Briefing production called "Lifting Body Flight Test Vehicles."

John McTigue, NASA program manager; Milton Thompson, NASA chief project pilot; and Ralph Hakes, Norair M2-F2/HL-10 Project director, discussed various elements of the program. Dr. Martin L. Klein, a former Northrop employee, was moderator.

Many film clips and models used on the program were prepared at Northrop.

Station KCET (Channel 28) presented the telecast. Other Aerospace Briefing topics of interest to Northrop employees was a Gemini 7/6 program presented recently. An "Apollo Status Report" will be repeated at 7 p.m., Friday.



EROS MISSION—Manned vehicle to fly by asteroid Eros could look something like this, Eugene A. Smith believes. Circular devices are solar panels for power.

## AD ASTRA PER ASPERA

# Nondestructive Testing Experts Get First Glimpse of SST Challenge

By the NORTHROP NEWS Staff

Advanced developments in the wide-ranging field of nondestructive testing of industrial materials were revealed at the spring national convention of the Society for Nondestructive Testing earlier this month in Los Angeles.

Northrop Norair's Roy Wolford was chairman of the convention, which used as its theme: "Dynamic Progress through Nondestructive Testing."

Highlighting the four days of technical sessions was a luncheon address by Maynard L. Pennell, vice president and general manager of the Boeing company's SST division.

For most of the engineers and technicians in attendance it was the first glimpse of the challenges that lie ahead for them in construction of an aircraft which probably will carry 250 or more passengers and travel at 1800 miles per hour.

The first SST, which estimates say will cost \$1 billion to develop, should be airborne in 1969, Mr. Pennell said. Boeing is competing with Lockheed-California company for a government contract to build the jet.

(In anticipation of subcontract work on the SST, Norair Materials Research group began more than a year ago to perfect a new "thin film" brazing process which would enable fabrication of honeycomb sandwich structures in a new lightweight titanium alloy. The ability to honeycomb titanium promises substantial reductions in structural weight as well as increased joint strengths for the SST).

The advent of the supersonic transport era will require new developments in nondestructive testing, according to Mr. Wolford and Norair's Dan O'Halloran, national secretary of the Society.

The science of nondestructive testing embraces numerous methods for the detection and/or measurement of the performance and capabilities of materials, parts, assemblies, equipment, and structures, by tests which do not impair their serviceability.

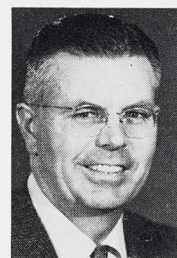
The more exotic the material used, such as titanium, the more exotic the methods for testing. Major tools used in today's testing are X-ray and isotope film, radiography, ultrasonics, magnetic particles, eddy currents penetrants, microwave and infrared.

Several Northrop members of the Society attended the convention, including Eduardo Regalado, a past chairman of the Society's Los Angeles section and recent winner of the Society's nondestructive testing president's award for outstanding officership and good section management.

Dr. Alexander Weir, jr., chairman of the Corporate council on quality and reliability, represented Northrop at the speakers' table during Mr. Pennell's talk.

### PACKAGING DATA EXPERIMENT

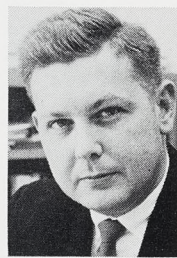
A joint Air Force-Northrop experiment in relaxation of controls on customer review of packaging data was described by Norair Senior Engineer William J. Grinnell to the Eighth Joint Industry-Military-Government Packaging



Mr. Wolford



Mr. O'Halloran



Mr. Hallstein

and Materials Handling Symposium in Washington, D.C. earlier this month.

Packaging data forms, required by Air Force specifications, are prepared in detail and forwarded by Norair to its customers to indicate preservation and packaging procedures on most new items being furnished as spare parts.

The volume at Norair is about 175 forms a month.

Prior to the year-long experiment, each data form and its accompanying packages was placed in a hold area to await arrival of an Air Force packaging specialist.

He had to review in detail 100 percent of new forms prepared, even though some were exact duplicates as far as packaging procedures are concerned.

During the experiment all items were placed in one of four categories, each with its own review criteria. The degree of review ranged from zero percent for certain standard items to 100 percent for critical, high value, hazardous, functional items.

As it worked out, the total review for the year covered 48 out of each 100 new packaging data forms with no increase in error rate, Mr. Grinnell said.

Both the Air Force and Norair are presently evaluating the results.

Whether or not the plan is ever implemented on a broad scale, Mr. Grinnell told the symposium that use of the category system could lead to computerized data preparation at some future time.

### IMPACT SURVIVAL LIMITS

Studies in impact tolerance and survival limits of man as influenced by support-restraint systems were discussed recently at an AIAA Specialist Meeting in Los Angeles by Dr. C. F. Lombard and Dr. S. H. Advani of Northrop Space Laboratories.

Basic knowledge being gained from the studies include identifying mechanisms of injuries, or just how an injury occurs. Developing out of such basic research is a technology of support and restraint systems, which could include new types of seats and restraints for crew members of spacecraft.

Dr. Lombard, head of NSL's Biodynamics Laboratory, and Dr. Advani, member of the technical staff, indicated in their presentation that "accepted impact survival limits are very conservative due to lack of improvement in support and restraint systems technology."

An interesting aspect of the studies, to the layman at least, is a concept of the human body

(See AD ASTRA, page 7)

## METALLURGICAL ASPIRANTS



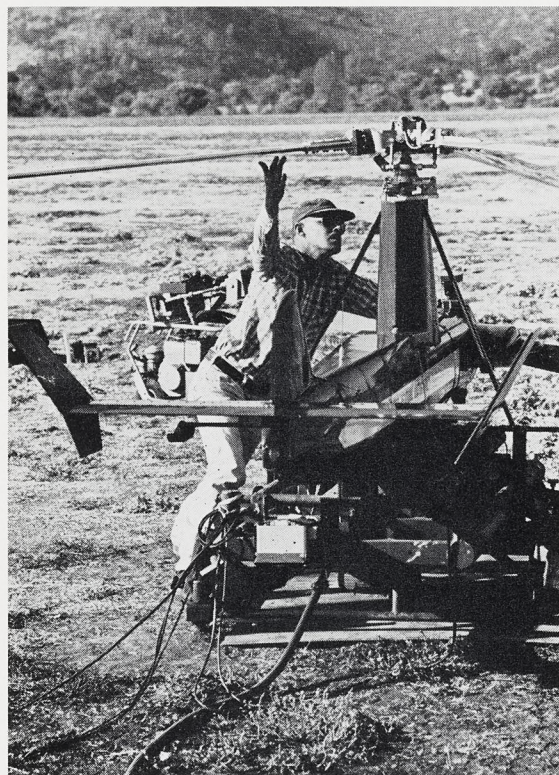
Don Bosco Technical High School's top metallurgical students, officers and members of school's chapter of Society for Nondestructive Testing, the only organization of its type in the United States, were recent visitors to Norair. They

heard key people discuss latest trends in field, toured assembly line and enjoyed lunch. Men along front rows (right and left) took part in program.





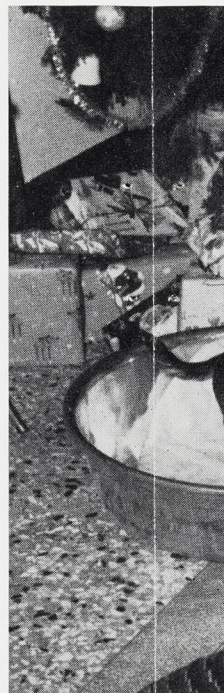
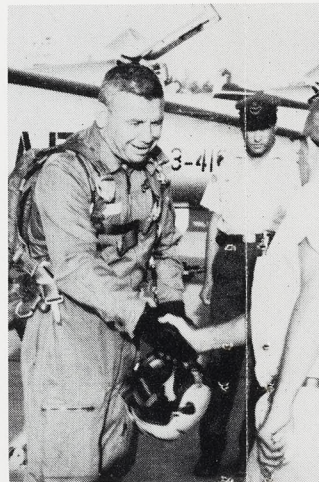
Controlling one of Northrop Ventura's drone test flights in photo (above), Jack Bean shares tense moment with Alex Krivka. Mr. Bean, one of Ventura division technical representatives, handles development flights. Others provide target services for the Army, Navy and National Guard both on continent and abroad. Instruction of military personnel on use of drones is another important function. Below, Mr. Bean checks out a developmental target and reconnaissance drone.



Desk space overseas is not always available and reports are often typed in unusual places, like Lloyd Millar's bedroom in Greece (right). Trio (below) put in long hours with "Skoshi Tiger" F-5 squadron in Vietnam and received thanks and models from F. W. Lloyd, Norair vice president and assistant general manager—Operations on return. They are, from left, C. E. Johnson, I. M. Houts and R. O. Purcell.



Norair's Jack Mann (left) wears unusual combination that causes little comment at his duty station, Turkey. Al Eldridge (above) helps Royal Hellenic Air Force maintenance men check out new equipment, while his wife, Julia (right), offers tidbit to donkey pulling ice cart, a common sight in Greece.



## DEDICATED MEN SERVE

# Around The World With

Dispersed around the world, wherever Northrop products are in use, is a select and dedicated group of men performing vital services for Northrop Corporation.

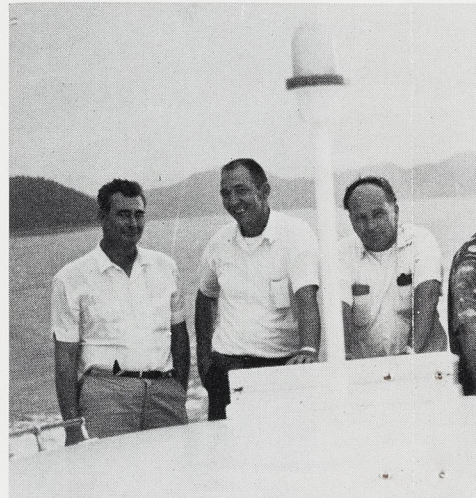
They answer to many names—service engineers, field technicians and contractor technical representatives, to name a few.

They serve in many locales—from deserts to tropics, on land and on sea, in remote outposts and thriving cities.

Each day they work closely with citizens of many nations, with military, governmental and civilian leaders on many levels. Their worldwide duty stations is a small indication of the diversification and extent of the many products Northrop provides throughout the free world.

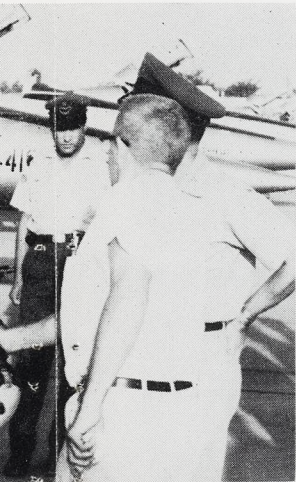
Although these men represent many elements of Northrop and extensive product lines, they share a common bond. They are dedicated to seeing that Northrop customers, the users of its products, receive maximum benefits from the smallest component to the largest system.

Northrop always selects its finest for field assignments for in their capability, actions and conduct the men reflect a distinct image of

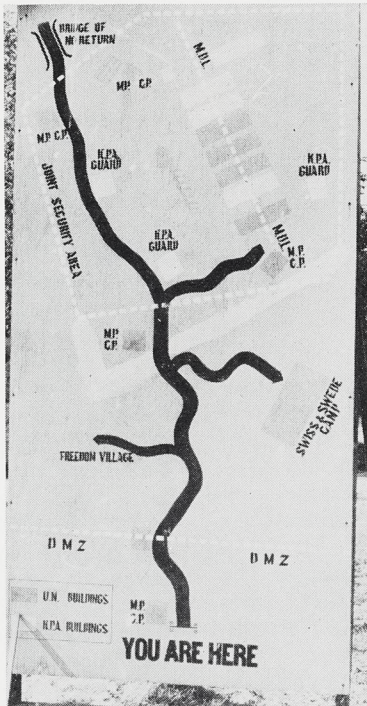


Norair's Al Bardrum (photo at right) and Republic of F-5 fighter. Speeding launch (above) takes, from Erv Teare and Emerson Hofsommer of Norair, Ma Soon across waters near Republic of Korea.

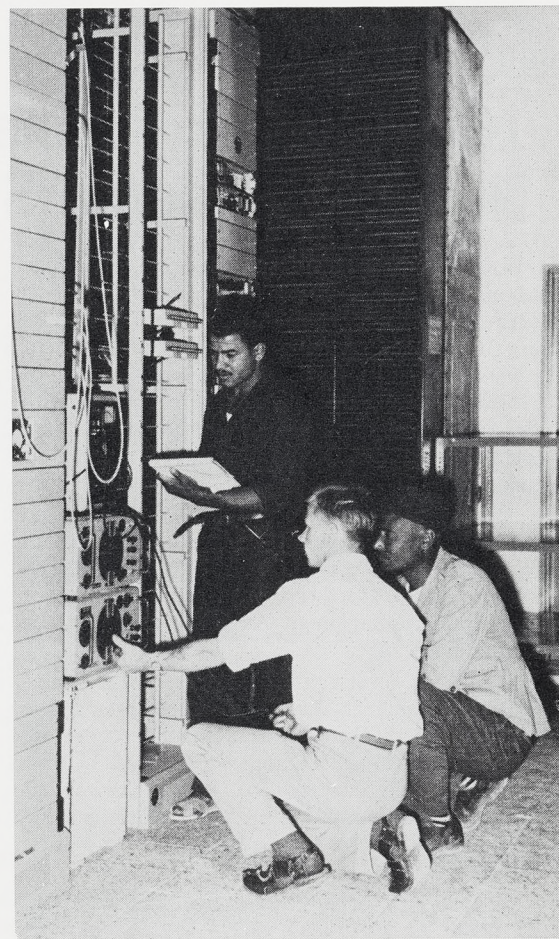




Major General Harvey Jablonsky, USAF, chief of the Armish-MAAG, gets welcoming handshake from Norair's Walt Sundberg upon completing F-5 flight in Iran (left). Happiness is a warm puppy and Christmas in any land as Al Bardrum's daughter shows (below) in observing occasion in the Republic of China.



First aircraft arrival (above) at Craig Air Force Base, Alabama, prompted gathering of Colonel R. L. Ault, USAF, GE's Gordon Biggens and Norair's D. L. Marine and Ralph Quinn. Nortronics' T. E. Kelec stands beside Mare Island Navy Yard plaque near San Francisco (below). Norair representatives in the Republic of Korea snapped picture of guidepost (left) noting key point in demilitarized zone dividing North and South Korea.



## With Northrop

Northrop wherever they serve. Training for a specific assignment is detailed; training for field work a lengthy process. Each man is a veteran employee who has worked with his product many years. Each knows his component or system intimately enabling him to solve maintenance and supply problems quickly and effectively. And each must keep abreast of even the smallest changes.

Accepting a field assignment involves changes—in environment, living conditions, climate and diet.

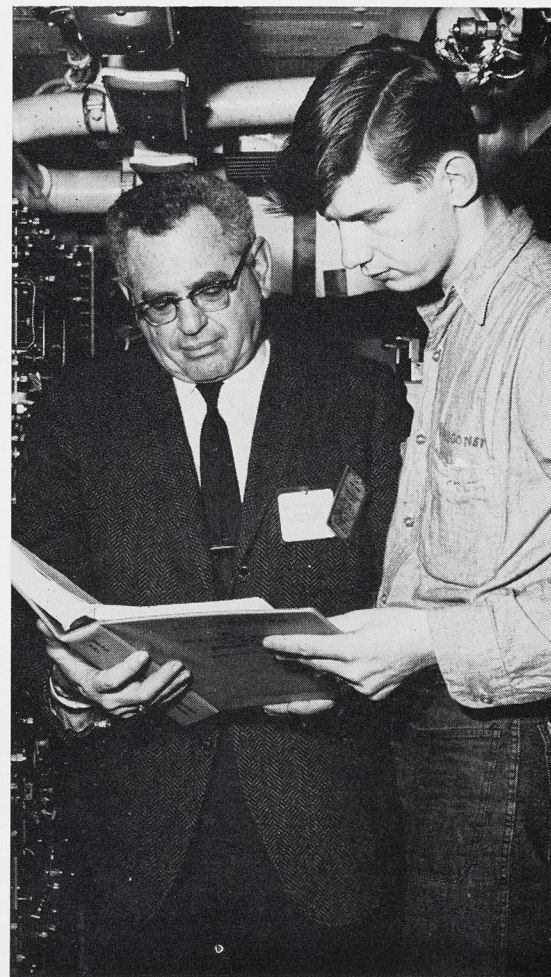
Families, too, face similar changes for most field assignments are for extended periods and families accompany field men to duty stations.

Once on-site at his station, the field man automatically gears his life and actions to those he serves. He is always on call, often works long hours for extended periods in all kinds of weather and under adverse conditions.

Few, if any, men who fill these jobs would change places with those at home plants for above all they like being where they are, doing what they are doing. It is a never-ending challenge.



Page Communications Engineers (above) range world installing equipment like this telephone unit being checked out in Libya. Sy Shenkman of Nortronics (below) talks over problem with Navy Polaris submarine crewman at base in Scotland.



Republic of China crewmen go over finer points (above) takes, from left, "Moose" Ramos of GE, Bob Purcell, of Norair, Major Ed Moore, USAF, and Colonel Lee Kun Korea.





## NEW ON THE HUNTSVILLE SCENE



Newest addition to 2000-acre industrial complex established in 1961 by the city of Huntsville, Alabama, is this building which houses Northrop Space Laboratories' Hunts-

ville operations. The second unit to be constructed for NSL, this building doubles available floor space on Northrop's 42-acre site.

## COUNTDOWN TO ZERO

## 16 Japanese Businessmen Attend Norair-Sponsored Symposium

Late last month, 16 members of the Japan Management Association—representing a broad spectrum of Japanese business enterprises ranging from banking, aircraft, steel, automobiles, paints and chemicals companies—were guests of Northrop for a one-day seminar dealing with the motivational approaches and implementation techniques presently being utilized in the Northrop Zero Defects Program.

Development of the ZD study team from Japan was the result of material provided them by Northrop Zero Defects Project office following a visit to Northrop by a representative of the Japan Management Association during the summer of 1965.

Upon his return to Japan, the JMA representative, Seiichi Nakajima wrote a letter to the Northrop Zero Defects Project office requesting as much information about the entire ZD Program as could be provided. The material sent to him was ultimately published in various trade journals and industrial newspapers throughout Japan.

Following a brief welcoming address by W. E. Reese of Customer Relations, and a short talk about the military implementation of Zero Defects by Major T. S. Bean of the Northrop USAF Plant Representatives' office, the morning session of the full-day seminar for the 16-man JMA ZD study team reviewed the pre- and post-ZD Day aspects of the program, stressing the motivational approaches, implementation techniques, and the sustaining methods presently being utilized throughout Northrop Norair.

At the conclusion of lunch, the JMA group toured the Plant I assembly line area and attended a comprehensive briefing (conducted by ZD council member Ed Foord in the conference room of the Product Support department) regarding the various ZD activities in which the Product Support personnel are currently taking part.

From the Product Support area, the JMA study team traveled to the Mariposa facilities of Materiel where Deputy Director M. J. Fayweather reviewed the organization's Key Quality Award program and answered questions concerning ZD activities currently being conducted.

ZD council member George Davidson served as tour guide at the Mariposa facilities to provide the JMA study team an opportunity to personally observe some of the ZD sustaining and motivational activities in actual application.

The seminar concluded in the Materiel conference room with a brief dissertation on the problems of communications delivered by L. L. (Verne) Reynolds of Industrial Relations. The next hour was devoted to a question and answer session on the various aspects of the Northrop Zero Defects Program.

The members of the JMA study group in the accompanying photograph, together with their respective business enterprises in Japan, included: Takuzo Ogawa, associate director, Planning department, Kawasaki Aircraft Company; Tadataka Matsumoto, manager, Production department, Okano Electric Wire Company; Kenji Shirai, chief, Planning section, Control & Administration department, Enshu Limited; Hiroyuki Suzuki, manager, Production Processing center, Nippon Accumulator Company, Limited; Hideo Kokubo, chief, Office Administration department, Saitama Bank; Tomoichi Kadono, assistant manager, Quality Control Division, Nippon Electric Company; Kazuo Hino, Technical section, Technical Administration department, Technical Headquarters, Mitsubishi Heavy Industries, Limited; Naoteru Naka, executive managing director, Keihan Electric Wire Company; Tsutomu Itakura, assistant manager of Industrial Engineering department, Osaka Steel Works, Sumitomo Metal Industries, Limited; Kazuo Kobayashi, assistant to chief of section, Office Systems and Procedures department, Sumitomo Metal Industries, Limited; Hideto Ouchida, chief, Business Improvement section, Daihatsu Kogyo Kabushiki Kaisha; Yaichi Yamano, chief inspector, Osaka division, Daihatsu Kogyo Kabushiki Kaisha; Kojiro Seiki, chief, Production Control section, Honny Chemicals Company, Limited; Yoshimi Ishikawa, director, Consulting and Education Division, Japan Management Association; Shigeru Maeda, editor-in-chief, Management News, Japan Management Association; and Ryuji Fukuda, product manager, International Division, Japan Management Association.



## Northrop Attends NASA-Sponsored CMIP Seminar

Northrop was among 39 contractors invited to attend a NASA-industry cost reduction seminar at Dallas, Texas, last month.

Purpose of the seminar was to exchange ideas on methods of increasing the effectiveness of cost reduction efforts, according to Ken Hornor, Corporate Cost and Management Improvement Program coordinator, who represented Northrop at the seminar.

Northrop was invited to participate in the NASA program following an evaluation of the outstanding Norair Division CMIP effort for fiscal 1965. A certificate of approval of the Corporation's program, signed by NASA Administrator James E. Webb, will be forthcoming in the near future, Mr. Hornor said.

"The seminar was especially well organized and proved to be of interest and benefit to all concerned," he added.

Mr. Hornor pointed out that evidence of the high level interest in cost reduction activities is reflected in a telegram to Brooks Preacher, director of NASA's Office of Cost Reduction, from President Johnson. The President's message read, in part:

"The continued strength of this country depends upon our ability to provide for national security, to meet our international obligations, and to pursue important endeavors here at home within budget limitations that will enable us to maintain a sound and healthy economy.

"This means that we must continue to look for better and less costly ways to do the job. I intend to continue to emphasize the necessity for efficiency and economy throughout the government and in concerns that are doing business or seeking to do business with the government.

"NASA and its contractors have started a fine Cost Reduction Program. This program has already saved NASA \$200 million. I am confident that your participation in this seminar will stimulate further progress in this very important effort."



Northrop Recreation Clubs have obtained discount tickets to ride Palm Springs' famed Aerial Tramway. Tramway is shown above making its 15-minute ascent to top of Mount San Jacinto. Ride moves from desert regions below to forested, and often snow-covered, highlands.

## Scarpero Heads PR For International

Ben H. Scarpero has been named head of Public Relations for Northrop International, it was announced this month by Norman Warren, Corporate director of Public Relations and Advertising.

Mr. Scarpero, a retired U.S. Air Force officer, joined Northrop last August as assistant head of Public Relations at Norair.

As a public affairs officer for the Air Force, he participated in numerous operations in the U.S., Europe, Middle East and South America.

As Public Relations representative to the International Division in Beverly Hills, he will assist in coordinating promotion abroad of Northrop products, which are currently in use in more than 50 countries.

## NORTHROP NEWS

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Telephone: 675-4611

## HAPPY LANDING, EARL



Captain Earl E. Hallum (center) has been re-assigned as a Forward Air Controller in Korea after a long period with Northrop's Air Force Plant Representative's office. Presenting him farewell mementos are Lieutenant Colonel Rufus K. Keeling (right), AFPR, and Major Roy J. Boyd. Farewell luncheon for Captain Hallum was attended by more than 35 friends. Working out of Palmdale, Captain Hallum has been active in Zero Defects, safety and quality efforts through AFPR's Safety and Flight Operations division.



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

# Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

**For Sale**

**Wood Shaper**, hvy. duty, 1/2 hp motor, stand, \$50. Huntington Bch., 897-6992. A

**Dining Room Table**, blonde, dropleaf, 4 straight chairs, 1 arm chair, padded seats, \$75. Hawthorne, 676-6625. A

**Refrigerator**, 7 cu. ft. Philco, \$15. Seal Bch., 430-3942. A

**Corvaire Monza**, 1963, stock and racing equip., 18,000 act. miles, \$1000. Redondo Bch., 370-0157. A

**Diamond Ring**, \$50. Redondo Bch., FR 8-0994.

**Furniture**, assorted, used, \$30 if all taken. Manhattan Bch., 379-6762. A

**Chevrolet**, 1953, 6 cyl., std. trans., rebilt. eng., 4 new tires, \$175. Lakewood, TO 6-8977. A

**Pickup**, 1/2-ton Chevrolet, 1955 w/shell camper, 1-owner, 41,000 act. miles, \$400. Hawthorne, OS 5-5695. A

**Chevrolet**, 1955 Nomad, rebilt. 283 eng. w/F.I. piston, Duntov cam., chrome rims, stick Hydro, new paint, AM-FM radio, \$975. Torrance, 328-1841. A

**Triumph MC**, 1964, Bonneville TTS, less than 1000 act. miles, \$800. Torrance, TE 5-8608. A

**MG-TD**, 1951, \$300. Inglewood, 676-2958, 873-4841. A

**Ford station wagon**, 1958, rebuilt motor, 4 new tires, \$400. L.A., 775-7827. A

**VW**, 1964 sed., dark blue, \$1295. Downey, TO 9-2700. A

**Record Player**, Hi-Fi, Webcor, portable, cost \$100, \$30. Gardena, DA 4-1593. A

**Surfboard**, 9' Hobbie, new pigment, \$50. Redondo Bch., 379-0038. A

**Piano**, Fairbanks upright, mahogany, \$150. Box 601. A

**Home**, in Westchester, 3-bdrm., bltin furniture, storage, beds, family & rumpus rm., landscaped rear yard w/patios & b-b-q, \$2750 dn. acceptable, \$36,750. L.A., 645-3019. A

**Seat** for Honda motorcycle, \$35 value, \$15. Torrance, DA 4-8663. A

**Plymouth**, 1957 2-dr. sedan, 6-cyl., std. trans., radio w/ rear speaker, heater, 40,000 miles on rebilt. 1958 eng., \$225. L.A., 752-7614. A

**Honda**, 1966, 50cc, C 100, 11 actual miles. \$200. Hawthorne, 675-4505. A

**Rug**, white wool, 12'x12' w/pad, \$75. L.A., 477-0610. A

**Bicycle**, boy's Schwinn deluxe Sting Ray, \$45. Redondo Bch., 371-8907. A

**Buick Super**, 1953, 2-dr. h/top, \$175. Hawthorne, OS 5-3866. A

**Pool Table**, 8', 2 5' cue sticks, balls, rack & chalk, \$75. Torrance, DA 9-2016. A

**Chevrolet**, 1959 Parkwood station wagon, r/h, Powerglide, V-8, \$495. P. V. Ests., FR 5-0867. A

**Opel station wagon**, 1960, \$200. Huntington Bch., 847-0956. A

**TV**, 24" RCA console, black & white, 5 yrs. old, \$50. L.A., 751-6727. A

**Plymouth Fury III**, 1965, 2-dr. h/top, 426 V-8, auto. trans., full power, AM-FM radio, rec. player Vibra-sonic, tach., Sure-Grip diff., \$2495. Gardena, DA 4-6390. A

**Stove**, Wedgewood, gas, white, grille, chrome top, \$50. Inglewood, 679-3879. A

**Cornet w/case**, \$40. Torrance, FA 8-5931. A

**Crib & mattress**, white, \$15. Manhattan Bch., FR 6-9964. A

**Drapes**, 3 pair, full length, white w/avocado green, fiberglass, 3 mos. old, \$25. Torrance, 323-1400. A

**Duplexes**, 2 four units, 2-bdrm., 1/2 blk. to Rolling Hills shopping center, fenced yards & patios, sep. gar., \$47,000. Hawthorne, 377-8777. A

**Karmann-Ghia**, convt., 1960, 46,000 mi., good tires & paint, tonneau cover, \$795. Redondo Bch., FR 5-5204. A

**Chevrolet**, 1962, Bel Aire, 2-dr., 6-cyl., r/h, auto. trans., w/s/w, \$850. L.A., EA 2-3426. A

**Sharpener**, lawnmower-type, \$150. Santa Monica, 675-1042. A

**Bedroom Set**, full-size ortho. mattress & spring w/frame, 5-drvr. dresser, night stand, bookcase headboard, \$85. Anaheim, 774-2779. A

**Falcon Futura**, 1961, b/seats, auto. trans., r/h, new paint, \$675. Hawthorne, 679-2488. A

**Renault Dauphine**, 1959, eng. & trans. rebuilt, 45 mpg, \$200. El Monte, GI 2-8888. A

**T-Bird**, 1956, h/top, recent o/haul, paint & tires, auto. trans., orig. owner, \$1275. Pac. Palisades, 454-2057. A

**Dishwasher**, GE deluxe, cherrywood top, \$200. Hawthorne, 679-3538. A

**Pickup**, 1960 Ford 1/2-ton, long bed w/8 1/2 non-cabover camper, butane range, water, ice box & intercom., \$1200 or \$400 for camper only. Torrance, 320-3440. A

**Dining Table**, rect. light mah., leaf ext. & 4 uphol. chairs, \$100. Tarzana, 343-7880. A

**Impala Super Sport**, 1962, 2-dr., b/seats, 327 eng., good tires, low mileage, \$1395. Hawthorne, 676-6021. A

**Jeep**, 1957, low mileage, extras, \$1800. Norwalk, 674-3603. A

**Television**, Packard Bell, 17", blonde oak cabinet, \$30. Torrance, DA 3-8797. A

**For Sale**

**Home**, 2-bath, 3-bdrm., in Lawndale, bltins, fireplace, completely landscaped, 5% dn., \$21,900. Redondo Bch., 376-3505. A

**Honda CB77**, 1964, 305cc, drag pipes opt., hvy. duty clutch, elec. starter, \$425. Westminster, 714-892-3807. A

**Ford**, 1957, 2-dr., good eng., new paint, \$275. Playa del Rey, 391-8072. A

**Sabre Saw**, Weller, \$10. San Pedro, TE 1-6462. A

**Cadillac**, 1953, r/h, p/s, air cond., new bat., good tires, \$125. Alhambra, AT 4-5698. A

**Dining Table & 4 chairs**, maple, \$50. Hawthorne, 675-7381. A

**Home**, 3-bdrm., 1 1/2 baths, bltins, newly decorated, 10% down, in Holly Park, \$23,950. Playa del Rey, 823-2788. A

**Quarterhorse**, sorrel, good roper, gentle, \$375. Tarzana, 344-1103. A

**Bar**, half-round circle, brass rail, 4-cushioned stools, aqua, cost \$270; \$100. Culver City, VE 7-2942. A

**Mimeograph Machine**, Niagara, \$15. Lawndale, OS 9-0876. A

**Console Table**, 38"x20", converts to card table or 90" dining table, walnut. \$45. Lomita, 547-2716. A

**Engagement & wedding ring**, cost \$700, \$350. Hawthorne, 679-2456. A

**Sailboat**, R-11 w/American trailer, dacron sails, paddles & life jackets, \$425. Torrance, DA 3-1026. A

**Bow**, Ben Pierson, 60", 35-lb., & cover, \$20. Hawthorne, OS 6-3886. A

**Enlarger**, Durst R305 w/lens, \$25. Manhattan Bch., FR 9-7775. A

**Mountain Cabin & 5 lots**, near church, sewers, Crestline, \$14,000. Lomita, 322-2773. A

**Sewing Machine**, never used, Morris Photomatic III, retails for \$310, \$160. Westminster, 714-531-4278. A

**MGTD classic**, 1950, excel. mechanical cond., paint & uphol. good, \$900. L.A., GR 2-2368. A

**Sunbeam Alpine**, 1962, 1-owner, r/h, w/s/w, tonneau, \$850. Santa Ana, 714-838-4903. A

**Steel Guitar**, Magnatone, cost \$200, \$50. Redondo Bch., 376-2068. A

**Sewing Machine**, Mont. Ward, portable, \$20. Long Bch., GA 3-1353. A

**Studebaker Champ**, 1954 spt. coupe, 6-cyl., o/drive, new int., \$200. Anaheim, PR 4-7138. A

**Exercycle**, used 1 year, \$100. Hawthorne, OS 5-2772. A

**Movie Camera**, Ricoh 8mm, auto. or manual zoom lens, batterv drive, snool loadine, elec. eve. orig. cost \$179, \$60. Lakewood, ME 3-6346. A

**Tire**, U.S. Royal, 6.50x13, narrow w/w, mounted on wheel, \$5. Lawndale, 371-6775. A

**Range**, elec., 2 ovens, auto. controls, 42" Kenmore, \$85. Manhattan Bch., 372-4907. A

**MGA**, 1958, best offer & take over \$50 nymts., \$565 bal. Playa del Rey, 398-1458. A

**Carnet**, 6'x4' Nen Persian, Kaskan, red w/ floral design, \$200. Hawthorne, OS 6-9175. A

**House**, low or no down. 3-bdrm., 1 1/2 bath, bltins, dble. gar., 1 mile from ocean, small yard, \$20,000. Redondo Bch., 374-2433. A

**MG roadster**, 1962, 1600 Mark II, r/h, \$1200. Port. Bend, 377-8444. A

**Runabout**, 16', trailer w/75 hp Scott outboard, \$1200. Inglewood, 677-2600. A

**Golf Clubs**, complete set Pro-line irons & woods, 1965 model Shakesneare glass shafts, used 2 mos., \$140. Hawthorne, OS 6-8997. A

**Recliner Chair w/vibrator**, white Naugahyde, orig. cost \$150; \$40. Hawthorne, 675-5654. A

**Humber**, 1960 recently o/hailed, \$750. Fullerton, 528-6914. A

**Phonograph**, portable, American-made, 3-spd., \$9.90. Hawthorne, 676-0418. A

**Triumph**, TR-3, 1959, \$750. Garden Grove, 714-897-7626. A

**Coffee Table w/2 end tables**, maple, \$25. L.A., 645-5516. A

**Chevrolet Nomad station wagon**, 1958, p/s, p/b, r/h, auto. trans., recent valve grind, new starter & radiator, newly replaced trans., \$375. P. V. Pen., 377-7241. A

**Fishing Outfit**, Truline Dynamo, 15-thread, full roller guided pole, Penn Senator 9/0 reel, \$55. Redondo Bch., FR 5-5760. A

**Table Saw**, Craftsman 10", 2 new exts., 2 extra blades, 1 hp ball bearing motor, on stand, \$125. Inglewood, OR 7-8868. A

**Chevrolet Impala**, 1964 Super-Sport, b/seats, r/h, new w/w tires, p/s, p/b, auto. trans., 327 cu. in. 250 hp eng., \$2195. Ontario, 714-984-4660. A

**Range**, elec. Westinghouse, coppertone, 4-burner, auto. oven & timer, 1 1/2 yrs. old, \$100. Gardena, 324-0274. A

**Trombone**, Buescher Grand, \$70. P. V. Pen., 377-3806. A

**Organ**, Baldwin model 40 Orga-Sonic w/percussion, Phillipine mahogany w/matching bench, 2 keyboards plus 1 octave of bass pedals, \$675. Redondo Bch., FR 5-3914. A

**Range**, gas, Gaffers & Sattler, 30" shaded coppertone, avail. after May 1, \$75. Inglewood, 672-2810. A

**Surfboard**, 9', Lyman & trailer, \$45. Torrance, 375-6071. A

**Stove**, Hotpoint elec. deluxe model, full size, clock & cooking timer, white, \$35. Torrance, 326-4944. A

**For Sale**

**Dodge Dart**, 1965, auto. trans., new tires, \$1500. Torrance, 328-7369. A

**Honda**, 1965 Dream 300, saddle bags, windshield, rack, radio, \$450. Torrance, 324-9118. A

**Apt. Bldg.**, 9 dlx. units, 3-bdrm. owner's unit, \$12,500 yearly gross, in No. Inglewood, \$105,000. Torrance, 325-9832. A

**Range**, gas, 4-burner, oven, storage space, white enamel, 36" wide, \$50. L.A., 645-5090. A

**Outboard Motor**, 7 1/2 hp Fishing Scott, used very little, \$100. Box 602. A

**Pencil Drawings**, Western Ghost Town, 8 originals framed to stand or hang, 9x12", \$5 ea. P.V. Pen., FR 8-1863. A

**Volkswagen**, 1958 new clutch & brakes, \$550. 931-6937. A

**Dinette Set**, 5-pc., blonde oak, \$25. Hawthorne, 676-3651. A

**Refrigerator**, Fridigidaire w/freezer compartment, \$75. El Segundo, 322-6655. A

**Ford station wagon**, 1959, air cond. all power, \$375. L.A., GR 4-3433. A

**Chevrolet**, 1957, 2-dr. sed. 6-cyl, stick, r/h, \$350. Torrance, 327-3538. A

**Table Saw**, tilting table, 7" blade, 1/2 hp motor, \$60. Torrance, 371-5229. A

**Refrigerator**, 10 cu. ft. G.E., 60 lb. freezer & revolving shelves, \$60. Torrance, 324-2992. A

**MGTD**, 1950, tires & paint 1-yr.-old, \$250. Hawthorne, OS 5-5522. A

**Ford V-8**, station wagon, 1955, country sedan, radio, orig. owner, \$125. P.V. Pen., FR 7-5853. A

**TR-4**, 1963, o/drive, new tires, \$1750. Fullerton, 871-5617. A

## Wanted to Buy

**Coffee Table**, walnut or mahogany, vacuum cleaner, preferably a Kirby. Wilmington, TE 5-9070. B

**Plymouth or Dodge**, 1949 or 1950, 4-dr. sedan. Torrance, 375-0449. B

**Sailing Dinghy**, fiberglass, from 8' to 12'. Box 603. B

**FREE (To Be Given Away)**

**Kittens**, 1 tabby & 3 white, 2 wks. old March 19. Manhattan Bch., FR 2-2287. D

## Rentals Offered

**Apt**, delux 2-bdrm., furn., lge. pool & patio, closed gar. & storage, near El Camino, \$135. Torrance, DA 9-5986. E

**Apt**, furn, 1-bdrm., \$110. Manhattan Bch., FR 4-0750. E

**Apt**, 1-bdrm., lge. furn., incl. utilities & heated pool, \$125 mo. Hawthorne, 644-1700, OS 9-7123. E

**Home**, 4-bdrm., 3 bath, fam. rm., covered patios, city & ocean view, avail. July 1, \$425 mo. P.V. Pen., 377-4268. E

**Apt**, furn. single, 1 blk. from Norair, util. incl., \$90. Hawthorne, 675-8170. E

**Apt**, 2-bdrm. & den, unfurn., newly decorated, in Inglewood, \$120. Redondo Bch., FR 4-1852, PL 8-5572. E

**Apt**, 1-bdrm., unfurn. or single furn., bltins, refrigerator & air cond., 20 min. to Norair, \$92.50 mo. West L.A., 391-7781. E

**House**, 4-bdrm., family & dining rooms, lge. yard, Rolling Hills area, \$375 incl. water. P.V. Pen., 377-8731. E

**Apt**, 2-bdrm., unfurn., gar., singles furn., util. pd., redecorated, 1 blk. from beach, \$80 & \$125 mo. San Pedro, 831-6789. E

**House**, 2-bdrm., gar., bltins, hardwood floors, water & trash pd., \$100 mo. Hawthorne, OS 9-7909. E

**Apt**, 1-bdrm., furn., 1/2 block to ocean, closed gar., adults, \$130 mo. Redondo Bch., FR 8-7905. E

**Rentals Offered**

**House**, 1-bdrm., furn. encl. yard & carport, in Lawndale, incl. rubbish removal & water, \$80 mo. San Pedro, TE 3-2512. E

**Vacation Cabins**, Lake Gregory & Crestline, sleeps 6 or more, \$25 weekend; \$60 week. Venice, EX 1-2040. E

**Apt.**, 1-bdrm., furn., bltins, pvt. deck, lge. pool, sub. parking, near Northrop, \$137.50 mo. Lawndale, 670-6084, 679-2117. E

**Apt.**, 2-bdrm., stove, bltins, 2 blocks from Norair, \$110 mo. Hawthorne, OS 6-7417. E

**Apt**, 2-bdrm., delux bltins, closed gar., close to schools, shopping & fwy., \$125 mo. Hawthorne, OS 6-1697. E

**Apt**, 2-bdrm. upper, unfurn., bltins, disp. refrig., water & trash pd., 2 children OK, short walk to Northrop, \$110 mo. Hawthorne, 675-4574. E

**Studio Apt**, 3-bdrm., 2-bath, dishwasher, lots of tile & closets, near recreation & transportation to schools, \$200 furn.; \$165 unfurn. Hawthorne, 679-1950. E

## Personals

I wish to thank everyone for the nice parties and gifts when I retired. RAY TAYLOR.

## For Sale or Trade

**Oscilloscope**, RCA 7", model WO-56A, probes & manuals, cost \$240, sell for \$75 or trade for photographic or tape recorder equipment. Torrance, 371-8701. M

**El Camino**, 1964, 3-spd., 15,000 miles, \$1800 or trade for 1964 Super Sport. Torrance, DA 9-1332. M

**Impala SS**, 1964, air conditioned, \$1708.56 bal. due; \$450 or trade for 1956 or 1957 Chevrolet, 2-dr., in good cond. & take o/ pymnts. L.A., 751-6045. M

## Going my way?

### Rides Wanted

**8 a.m. — 4:45 p.m.**

**Orange Ave. & Del Amo**, Long Beach. W. H. Covert, NSL ext. 2721, GA 3-1363. 5

**Anaheim St. & Figueroa Pl.**, Wilmington. T. M. Henrich, Norair ext. 2425, TE 5-9070. 5

### Rides Offered

**7:30 a.m. — 4:15 p.m.**

**Dale & Crescent**, Buena Park. Room for 2 riders. Travel Orangesthorpe, west to Atlantic, Atlantic north to 1st easy street west, return via Harbor & San Diego Fwy. D. H. Eaglin, NSL ext. 2655, TA 8-2857. 13

**8 a.m. — 4:45 p.m.**

**Orange Ave. & Del Amo**, Long Beach. W. H. Covert, NSL ext. 2721, GA 3-1363. 15

## New Bowling League Set for Beginners

A new NRC-sponsored bowling league tailored just for low average or beginning bowlers will meet at Del Mar Bowl beginning May 10.

Designed more as a fun league, the loop will afford beginners a chance to establish an average or low average bowlers to improve their average.

Entry forms for this league and some nine others to be sponsored by NRC (both Norair and Nortronics) this summer are available at Personnel Activities offices.

## AD ASTRA PER ASPERA

(Continued from page 3)

as a semi-fluid mass rather than a bony structure. Since most of the stress of blastoff, deceleration and "dry" landings of the future will be inertial, it is possible that blood-flow alterations and damage to the central nervous system would be more probable than broken bones.

One phase of the NSL studies is under contract to NASA to establish emergency impact limits for Project Apollo.

Basic data obtained from the research could also be applied to such pressing everyday problems as automobile safety, Dr. Lombard said.

## HALLSTEIN CHAIRS SEMINAR

Frank Hallstein, Northrop Ventura engineer, will be chairman of a Thermodynamics seminar April 13 at San Diego, during the 12th annual Institute of Environmental Sciences meeting and exposition.

E. W. Bentilla of Northrop Space Laboratories is co-author of a paper with T. C. Bannister, NASA contract monitor at Marshall Space Flight Center, Huntsville, Alabama.

Title of the Bentilla-Bannister paper, which is

part of the Thermodynamics session, is "A Research and Development Study on Space Thermal Control by Use of Fusible Materials."

It deals with the use of paraffin and its heat absorption capability for temperature control in space.

\* \* \*

## AND IN CONCLUSION

F. K. Oshiro, of Electronics Systems, recently gave a presentation in Bedford, Massachusetts, to the First Symposium on Ground Identification of Satellites, sponsored by the DOD's Advanced Research Projects Agency.

Three Northrop papers were given at technical sessions of the 1966 Western Metal and Tool Exposition and Conference March 7-10 in Los Angeles. David R. Apodaca, senior engineer, and A. J. Iler, casting consultant, of Norair discussed the use of high strength premium quality castings. Bernerd Gaennie, Manufacturing R&D administrator, spoke on recent advances in brazing structural assemblies. A. F. Eskelin, senior engineer in Manufacturing R&D discussed application of machinability data on the production of modern aerospace parts.

## NORAIR WELCOMES CHURCH LEADERS OF NEARBY CITIES

Thirty-two church leaders from Hawthorne and neighboring communities were guests of Northrop Norair March 16 for the first annual observance of Norair Clergy Day.

Taking part were ministers, priests and rabbis serving churches, parishes and synagogues in the area. They heard key Norair officials discuss current and future programs, Norair personnel policies and plans and toured key areas in the plant, including assembly lines, subassembly areas and Automated Operations Control points.

Richard E. Horner, Northrop senior vice president and Norair general manager, spoke to the group. Others taking part in the program were T. L. McCarthy, manager of Administration, Walter Fellers, acting manager of Research and Development, and the Reverend John Chambers of Employee Relations.

Norair hosted the group at a luncheon and presented a special film, "Northrop 1965," as a part of the program.

## Bridge Buffs Compile Library for Players

Here's something for the bridge buff — a special library composed of nothing but volumes on bridge ranging from material for beginners to advanced players.

It has been established, or rather storage arranged, in the Nortronics Anaheim Technical Information Center by the Nortronics Bridge Club.

Lyle Alexander indicates any of the 13 volumes may be checked out for a one-week period. Reservations may be made for particular volumes by contacting him at ext. 723, Anaheim.

Mr. Alexander indicated present plans call for adding further volumes to the library as NRC funds become available.

## ROUND TRIP

A U.S. Savings Bond owned by a resident of Iowa was swept up by a tornado and deposited on a farm in Illinois. The finder located the owner by the name and address on the face of the bond and promptly returned it.



## NSL to Design Seats For 3 Lunar Vehicles

Crew seats and (restraint systems) for application to three lunar vehicles are being developed at Northrop Space Laboratories under the Support Program for Extraterrestrial Research Project SUPER, a cooperative support program between the Air Force and NASA Marshall Space Flight Center, Huntsville, Alabama.

Air Force representatives at Wright-Patterson AFB are monitoring the program for NASA/MSFC.

Sid Shelton, project engineer, indicates that design requirements include compatibility with both the present Apollo soft pressure suits and hard-shell pressure suits proposed for use by astronauts on the lunar surface.

The seats and retention devices are being designed for the Local Scientific Survey Module (LSSM), Mobile Laboratory (MOLAB) and Lunar Flying Vehicle (LFV).

## DePauls Roll 1294 To Win Doubles

Vito and Pat DePaul rolled a net 1294 total to top 56 Northrop couples taking part in the second annual Nortronics Anaheim NRC Scotch Doubles bowling tournament held March 20 at Carter Bowl, Fullerton.

Norair's Don and Grace Somers finished second with a net 1264. Doug and Pat Davis shot a 1217, just 10 pins better than Norair's H. J. and Doris Swartz. Fifth place went to Don and Betty Barlow, also with a 1207. Nortronics Anaheim furnished the sixth place team, Drex and Billie Carlson, who had a net 1192.

Low duo for the entire tournament and winners for a prize for accomplishing the feat was George and Nancy Fujikami of Norair with a 1010.

## REFERRALS

(Continued from page 1)

two important steps. First, obtain and have the prospective employee complete a regular application for employment. Second, complete a referral award form. Preferably, the application and referral award form should be submitted together since referral award forms can not be accepted after application forms arrive at Nortronics. Award payments will be processed soon after the applicant begins work with Northrop.

Referral award forms and additional information on the award program may be obtained from any Nortronics Personnel office.



ANYBODY UNDERSTANDS THIS—Nortronics needs qualified engineering personnel to fill key job openings and some are coupling this need with the Employee Referral Award Plan to earn extra cash. Paul Faranda, Personnel administration supervisor, shows quartet what their payments

will mean in cold cash. The men (from left), Bill Davis, Walter Rush, James Goff and Delbert Harris, have each won referral awards recently. Plan revision calls for immediate processing of payments instead of after 90-day waiting period.

## TECH REPS: Our Foreign Service

(Continued from page 1)

The average Nortronics Tech Rep is a mature man in his late 30's. He has more than 15 years of aerospace experience to his credit, including some 10 years spent with Northrop. He has worked with the equipment he serves five, six or more years. He is motivated by a pride in Northrop, its products and the job he performs. His intimate technical knowledge of the equipment he serves enables him to resolve maintenance problems quickly and effectively. His familiarity with logistics provides a vital link in preventing supply shortages. Through him, the customer has a direct access to Northrop's many resources. And his factual and detailed reports from the field constitute a valuable source of information to Nortronics.

Most of Nortronics' Tech Reps were handpicked for the jobs they fill.

A majority were on hand during developmental work leading to the current DATICO family of automatic test equipment. They helped in its fabrication, check-out and deployment. Many had worked for extended periods in a wide variety of factory and technical assignments, gaining a broad and general background that now serves them well. Some had previously worked as Tech Reps for other firms. Many boast a military service background.

"Each Tech Rep assigned must

constantly study just to remain abreast of his responsibilities," said C. D. Leavenworth, chief of the Field Support group. "He must follow each new change in his equipment, operating procedures and new techniques closely. He cannot become complacent."

Normally, each Tech Rep will return to Nortronics at least once each year for further training and study. If his assignment locale prohibits a return, he must study extra hard all information sent to him.

The life of a Nortronics Tech Rep in the field is an exacting one, whether he serves with a shore-based installation, submarine tender or submarine squadron. He is on-call 24 hours each day and often must pull sea duty aboard tenders for extended periods.

Instructing is a prime assignment with many Nortronics Tech Reps as alternate submarine crews come ashore between tours of duty to receive the latest information regarding the equipment they utilize.

For the Tech Rep who draws duty in countries abroad many other factors are involved. He

must, of a necessity, move his family and adjust to changes in climate, diet, living conditions and customs. Some face a daily grind just to get by.

J. D. Tuttle, in Spain, writes of daily hauling water for drinking from the base to his home and has been forced to re-plaster his home about three times each year to offset moisture.

Mr. Tuttle reported to his California friends of an annual custom in Spain calling for the eating of 12 grapes, one for each stroke of the clock, to welcome in the new year.

George Spencer and Sy Shenkman, stationed in Scotland, enjoy the custom of "Hogmanay" each New Year's. This calls for the home to be spotless to receive visitors as the new year begins. It is said, they report, that if the first visitor of the new year is darkheaded and carries a piece of coal, it will be a prosperous year for the visited family.

"We had to go them one better by serving black-eyed peas and hog jowls for New Year's day dinner," Mr. Spencer added.

They add to the makeup of an unusual breed, a rare cat.

## Paris Executives Visit Hawthorne, Anaheim Plants

Three executives from SINTRA of Paris, France, were Northrop Nortronics visitors earlier this month.

Jean-Claude Deprez, Micro Circuit Laboratory manager, Christian Schneider, Space Laboratory manager, and Bernard Legens, Research and Development manager, all of SINTRA, took part in a two-day briefing on Northrop work in the fields of automatic test equipment and micro circuits.

The visitors attended briefing sessions at Anaheim and Nortronics Hawthorne.

## First 'Export Item' Logged by Trivco

A Trivco-produced trivet will soon appear in Munich, Germany, attesting the skills and salesmanship of the Nortronics Anaheim-sponsored Junior Achievement firm.

Nortronics' M. E. Skilling, chief of Industrial Engineering, bought the trivet and took it home. His mother, visiting from Germany, took an immediate liking to it and "requisitioned" it for her home in Munich. Mr. Skilling gave it up and bought another.

Nortronics Anaheim personnel will have an opportunity to see and buy similar trivets when Junior Achievement sales representatives from Trivco set up sales points in Anaheim lobbies and at the main plant entrance. The dates will be April 4 through 7 at lunch periods and after the first shift. The price is only \$2.50 per unit and the money goes to a good cause — Junior Achievement.

## Twilight Golfers Begin Signing Up

Team entries are now being accepted in the Nortronics Anaheim Twilight Golf League which opens April 28 and meets once each week for a 13-week period, NRC Commissioner Dick Clarke reports.

Play will be at the Alta Vista Country Club.

Entries must be made by April 8, Mr. Clarke said.

## MEDIUM RARE, PLEASE



Nortronics Anaheim's Douglas Leavenworth, Gerry Bromm and John de Beauvieres (from left) receive their orders from "Chef" Warren Sorenson at 1966 Scout-O-Rama Kickoff dinner held recently. Men were among 250 scout leaders

gathered to plan June 3-4 event at LaPalma Stadium, Anaheim. Some 12,000 scouts will take part in event aimed at acquainting public with scouting activities.



Summer program which allowed nine Air Force Academy cadets to do research in mathematics and physics led to plaque for Northrop Corporation, accepted by Dr. Donald Hicks (center), Nortronics vice president and manager of Applied Research department. Award comes from Brigadier General Robert F. McDermott, dean of faculty, as John Maybee, one of nine cadets who studied at Newbury Park plant, looks on.



## \$2000 Prize Presented for Suggestion

Two Northrop Nortronics men, Ken Dohrmann and John Myers, have recently parlayed original ideas and initiative into extra cash through the Employee Suggestion Award Program.



Mr. Dohrmann

Mr. Dohrmann, an Engineering project administrator at Nortronics Hawthorne, really hit the jackpot in the form of a maximum award of \$2000, the first such to be presented to a Nortronics employee.

Mr. Myers, a member of the Mechanical Assembly and Test organization at Nortronics Ana-

(Photo on page 8)

heim, received \$115, well above the average award payment.

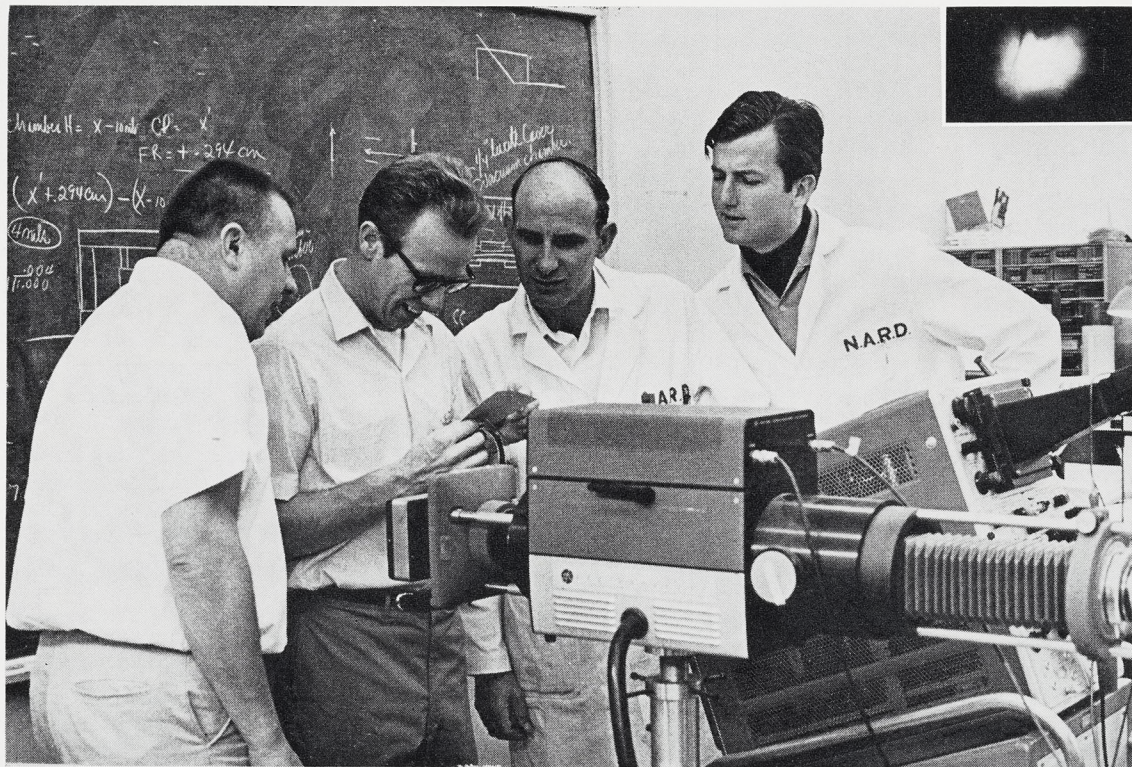
Mr. Dohrmann's outstanding suggestion was the development of a new and streamlined procedure for the charge out, accountability and maintenance of engineering data such as blueprints and drawings. It resulted in the savings of over 13,052 engineering and clerical man-hours annually. After deductions for new forms, the net savings was in excess of \$63,830 per year. Thus, it answered the criteria for both time and labor saving.

An improved method of drilling ailerons was proposed by Mr. Myers. It led to increased output, improved quality and a saving of approximately 834 man-hours per year.

Mr. Dohrmann received his award from Ross Miller, Nortronics vice president and manager—Technical department, with Clyde Getz, chief of the Hawthorne Special Projects office, looking on.

Grant Gunderson, chief of Production at Nortronics at Anaheim, presented Mr. Myers' check. Mr. Myers' immediate supervisor, Foreman Bill Gramm, also took part.

## WELL, WHAT DO YOU KNOW



No, it's not a pinup queen that Lloyd Ahlberg, Alex Seaman, Tom Minna and Jim Winter are looking at. It's the result of an "exploding foil" test photographed at Northrop Nortronics Applied Research Department at Newbury

Park. The men explode aluminum foil by passing a high voltage current through it, to simulate high-pressure, short duration shock waves produced by nuclear weapons. The inset in the upper right hand corner is the actual photo.

## F-5'S IN VIETNAM TO REMAIN, JOIN COMMANDO WING

### BULLETIN

The Air Force F-5 Freedom Fighter Squadron, temporarily in Vietnam for test purposes, will be retained on permanent assignment, it was announced at Northrop News press time by Lieutenant General Joseph H. Moore, Air Force commander in Vietnam.

General Moore said that the provisional squadron would be redesignated the 10th Fighter Commando Squadron and be assigned to the 14th Air Commando Wing.

He said the new unit will be given additional aircraft and will be stationed at the Bien Hoa Air Base. This was the first official announcement by the Air Force that additional F-5's will be ordered.

## Photometric Standards Not Taken Lightly at P.V.

Because of requirements that could not be fulfilled anywhere in the world 10 years ago, Nortronics has its own advanced Photometric Standards Laboratory at Research Park, Palos Verdes.

These requirements were for very low level precisely calibrated light sources to be used in calibrating star photometers and in star-sky simulators. The simulators, in turn, were to be used to test and calibrate star tracking systems.

As a result of this 10 year effort in the area of light sciences Northrop has kept ahead of the state-of-the-art.

In 1956, Nortronics was using radioisotopes as reference light sources in their photometers, the devices used to measure the intensity of light sources. Later these radioisotopes were used in

the star tracking systems as well. But the methods of calibrating the systems and providing adequate simulation were not working out.

At that time the photometrics laboratory was in Plant Two at Hawthorne.

"As it turns out," reports Walt Clark, now head of the Photometric Standards Laboratory, "the stars had certain color, or spectral, characteristics that Nortronics wasn't matching with its light sources."

Frank Crandell of the California Institute of Technology came to Nortronics at that point to work on the problem.

Mr. Crandell had just completed the task of reproducing the Palomar "star survey" for the National Geographic Society in conjunction with his other responsibilities at Cal Tech.

He had a background of 14 (See LIGHT, page 8)

## PSD CUTS TIME SEVENFOLD

## Ring-Around the Turn-Around Crisis

The ultimate success of operational automatic test equipment (ATE) is dependent upon many factors, including one all-important aspect — the amount of out-of-service time required for repairs.

The military calls this turn-around time.

Since 1962 Northrop Nortronics' Polaris Support Depot has waged an all-out effort to improve performance and reduce costs while lowering turn-around time in its support of the U.S. Navy's Polaris Missile Program.

Before 1962 the average ATE turn-around time was five months. In its first year of operation the Polaris Support Depot dropped this average to 1½ months for items repaired in-plant and 2½

months for those repaired by vendors. Further reductions were made until the current average is a mere three and eight weeks respectively, an obviously successful effort.

Equally impressive was the volume in that the Polaris Support Depot, from early 1962 through mid-1965, handled approximately 7500 items, repairing and returning to service 5100 of them. Their replacement value: \$16 million.

During this time the unique organization also modified 17 Polaris missile test systems and 30 major electronic-packed drawer assemblies with an acquisition value of \$6.5 million. It also manufactured special spares (for out-of-production systems) assemblies

ranging from terminal boards to major drawers with a value in excess of \$5 million.

Currently manned by a staff of 75 experienced and versatile technicians under Chief M. A. "Cy" Seeley, the Northrop Polaris Support Depot is the only known organization of its type conceived, operated, and devoted exclusively to support functions. Within its close-knit ranks are capabilities for tool and operation planning, tool maintenance, scheduling, change control, blueprint control, production control, maintenance of a customer Bond Room, test and analysis, repair, modification, assembly, paint and process and packaging. There are also internal provisions for quality assurance (See DEPOT, page 8)

## Hawk Line To Increase Production

Northrop has received a letter of intent from Raytheon Company, Lexington, Massachusetts, to purchase for an amount in excess of \$5 million missile ground handling equipment and airframe components for Hawk surface-to-air missile systems, to be supplied by Raytheon to the government of Saudi Arabia.

The Hawk systems are being purchased by Saudi Arabia, in accordance with U.S. State Department policy, as part of its new, modern air defense system.

Manufacture of airframes, launchers, loaders, missile wings, elevons and hydraulic actuators for the missile system is centered at Nortronics Anaheim. Production of these items is expected to span a period of approximately 14 months.

The Hawk is a radar-guided missile for use in protection against both medium-to-high and low-flying aircraft. The missile system is operational with both the U. S. Army and U. S. Marine Corps in Vietnam and elsewhere in the world. It is also used by five NATO nations.

Northrop has participated in the development and manufacture of the Hawk system since its inception in 1954. The missile launchers and loaders, which were designed by Northrop, help give the Hawk its mobility due to their ability to operate on rough or muddy terrain.

## Defense Contract Official to Speak At Club Meeting

Lieutenant Colonel Frederick Sparrevohn, director of Quality Assurance for the Los Angeles Defense Contract Administration Services Region, will address the Nortronics Management Club April 20.

The affair will be held in the Long Beach Elks Club, 4101 East Willow Street, beginning at 5:30 p.m.

A World War II heavy bomber pilot, Colonel Sparrevohn has held recently filled key posts at such installations as the San Bernardino Air Materiel Area, Vandenberg Air Force Base, and the Air Force's Los Angeles Contract Management District. He will speak on the new Department of Defense contract administering

(Photo on page 8)

alignment, its purpose, objectives and ultimate impact on contractors.

Pat Foster, Management Club president, and his newly-elected slate of officers have been busy in recent weeks mapping out a full year of activities for the club.

While some arrangements are yet to be completed, plans now call for regular meetings in June and August, augmented by a joint meeting with other Northrop clubs in October and a dinner-dance, tentatively set for the Ambassador Hotel, in November.



Photometric Standards Laboratory head, Walt Clark, adjusts Nortronics lamp in housing on photometric bench.



## NORWAY FOURSOME REPORT

## 'Wish You Could Have Been There'

"It would be wonderful if 10,000 Northrop employees could go to Norway, to be accepted as we were, to feel the confidence placed in the F-5 fighter, and to share in the enviable reputation Northrop, its products, and people, are afforded there."

Elmer Lohry, Paul Minoletti, Hubert Peck and Milton Rogers share this consensus.

The four, hourly-rated men were selected to represent all Norair employees at ceremonies there. They joined T. V. Jones, Northrop president and chairman, and other officials in Norway last month as 11 F-5's, the vanguard of 68 ordered, were delivered to the Royal Norwegian Air Force.

Proud of the aircraft they have selected to defend their nation, RNoAF officials felt it was appropriate to have men who helped build the F-5's take part in initial delivery ceremonies. This led to the selection of the four and their subsequent trip to Norway.

Now back on their jobs at Hawthorne, Palmdale and Edwards Air Force Base, the four were contacted individually for their views of the trip.

To the man, they expressed a deep feeling of humbleness and pride in being singled out for the trip. Each expressed a wish other employees could have accompanied them. And each reports

a now busy schedule relating their experiences to fellow employees, friends and relatives.

Only Mr. Peck, who served with the armed forces in Japan, had been out of North America previously. Thus the trip, which saw them making stops in Norway, England, Ireland and New York City, was a memorable excursion.

Foremost in the mind of each is the feeling the people of Norway are wonderful, without peers in friendliness, courtesy and helpfulness.

"When we arrived," Mr. Peck said, "we were immediately put at ease. From shop clerks who dashed madly about to locate English-speaking associates to serve us, to military and government leaders who went out of their way to make our stay enjoyable, everyone was wonderful.

"We had a nice chat with Norway's Crown Prince Harald," Mr. Lohry reports. "He was interested in us, our jobs and our families. And he expressed a desire to visit Hawthorne and see the F-5 in production."

Frequent mention was made of the long and close relationship between Norway and Northrop Corporation, dating back to World War II when Northrop produced N3-PB patrol bombers for the RNoAF.

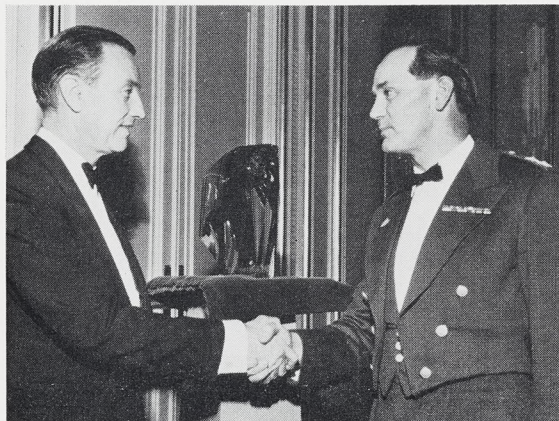
Mr. Minoletti, like the others, enjoyed talking with Colonel Kristian Ostby, now retired, who flew evaluation of the N3-PB and subsequently guided contract negotiations for production activities.

"Colonel Ostby has a remarkable memory for details and tests involving the N3-PB," Mr. Minoletti said. "We enjoyed bringing him up to date on people he remembered."

For Mr. Rogers the trip allowed renewal of a friendship with Captain Per Ekholdt who flew F-5 evaluation for the RNoAF at Edwards Air Force Base where Mr. Rogers is a flight line crew chief.

"Captain Ekholdt tells me he and other RNoAF pilots are really sold on the F-5," Mr. Rogers said. "It gives you a warm glow to know men like these place such confidence in aircraft you help build and test. And it makes doing a good job more meaningful."

"Northrop officials in Europe made it possible for us to learn a great deal about Norway (See FOURSOME, page 7)

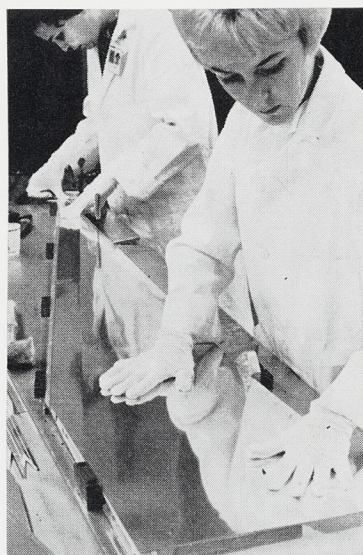


Mr. Jones presents Northrop Trophy to General Wilhelm Mohr, commander-in-chief of the RNoAF. All squadrons of the RNoAF will compete for the trophy, described by Mr. Jones as "a symbol of the growing association and relationship between Northrop and the RNoAF."



A NORWEGIAN SETTING—Pause in busy schedule associated with delivery of 11 Northrop F-5's to Norway, found this group of participants before one of ships delivered. They are, from left, General Jacob E. Smart, deputy commander,

U.S. Forces Europe; Margaret Tibbetts, U.S. Ambassador to Norway; Paul Minoletti, Hubert Peck, Elmer Lohry and Milton Rogers, hourly-rated Norair representatives, and T. V. Jones, president and chairman of Northrop Corporation.



Wing assembly for Maxson MKD2B drone undergoes prefitting process in hands of Marge Mertz (left) and Kay Low in Northrop Ventura plastics fabrication section. Assembly will next be placed in press for curing under heat and pressure.

## Interest Mounting In World Tour

Interest in a 33-day around-the-world tour sponsored by NRC Travel Clubs continues to build as the September 2 departure date draws near.

A meeting at 7:30 p.m., April 27 at NRC Clubhouse, Hawthorne, will feature films and representatives of tour services to answer questions.

Cost per person is \$1495 and includes jet air fare, hotels, sightseeing and most meals for a tour that touches Tokyo, Hong Kong, Bangkok, New Delhi, Beirut, Jerusalem, Cairo, Istanbul, Athens and the Greek Islands. Brochures are available through Personnel Activities offices.

## Cheer the New Angels, Boo the Dreaded Twins

Northrop Recreation Clubs have obtained a block of 250 tickets to the April 23 California Angel-Minnesota Twins baseball game at the new Anaheim Stadium. They are available to Northrop personnel for only \$3.50 each as long as they last.

In addition to an exciting game, the April 23 affair promises many other surprises. It will be the first nationally televised game from the new stadium. Walt Disney and his organization are joining the festivities and will present a pre-game extravaganza, starting at 10 a.m. Game time is 11 a.m.

Northrop employees purchasing two or more tickets will receive a special Angel "fun pack" loaded with surprises and special features.

Tickets are now available through all Northrop outlets.

## RETURN OF W-4'S CAN SAVE EXCESS TAX DEDUCTIONS

Friday, April 15, is the deadline for returning recently issued Withholding Exemption Certificates (W-4 Forms) to Northrop paymasters.

All Northrop employees received W-4 Forms last week as an important step in instituting a new system for withholding Federal income tax from wages which becomes effective May 1, 1966.

Employees must complete the forms to indicate whether they are married or single and show the number of dependents claimed as of May 1.

Failure to comply with this step can cost employees money because the Federal Government directs that failure to provide this information may result in weekly withholding tax deductions based on single status—no dependents—leading in many instances to excessive tax deductions.

For example, a married man with three dependents makes \$100 per week. He fails to claim his deductions, resulting in a weekly withholding rate of approximately \$16.80 (single rate with no exemptions). If he claims his deductions (4) and married status, his withholding rate would be approximately \$6.50 per week.

Information distributed to all employees last week explained the new system and also included examples of withholding under the system presently in use and the one becoming effective May 1. This information was for use as examples only, actual withholding rates may vary slightly from this formula.

The important thing now is to complete the new W-4 Form without delay and return it to the paymaster by Friday.

## Savings Plan Open For Changes in May

Northrop participants in both Hourly and Salaried Savings Plan may change the amounts of their contributions and non-participants may enroll in either plan to be effective May 2, 1966.

Maximum contributions are \$6 for hourly rated employees and five percent of base salary for salaried personnel.

Cards authorizing a change or initial entry in the plan may be obtained from Northrop Industrial Relations (Personnel) offices.

## SEVEN AWARDS PRESENTED

## Five Perfect Records Pace Safety Performance for Year

Seven awards—five of them for perfect records—were presented Northrop facilities last week by the Greater Los Angeles Chapter of the National Safety Council in recognition of "high standards in occupational safety" for 1965.

Pacific Curtainwall, Inc., wholly-owned subsidiary based in Long Beach, took two awards in the Metals Products and Steel Fabricating category. Both its shop section and field section posted perfect safety records for the year.

Northrop Nortronics' Hawthorne facility earned a first

place award in the Electrical & Electronics Division competition, by posting a perfect record.

Two Northrop Norair facilities—El Segundo and Edwards AFB—also won first place awards for perfect records in their respective categories.

Mariposa facility in El Segundo, competing in the Wholesale, Warehouse and Storage category, has logged a perfect safety record in four of the past five years. The Edwards facility previously had accident-free marks in 1959, 1961, 1962, and 1965.

Northrop Architectural Systems, headquartered in the City of Industry, won second place in the Miscellaneous Metal Products category in competition with 21 other companies.

Nortronics Palos Verdes, entered in the same category as Nortronics Hawthorne, was awarded second place honors.

"The Northrop record this year was the best in the company's history," according to Lee Johnson, chief safety engineer at Norair and chairman of the awards program for the Los Angeles chapter.

There were eight Northrop

entrants in the contest, which began in January of 1965. At the end of the year, the Safety Council tabulates results of monthly reports submitted on lost time accidents.

Scoring is based on the number of lost time industrial injury cases per million man-hours worked.

"It was especially significant that facilities with fewer employees ranked so high," he added. "Normally, it is a disadvantage because the fewer man-hours worked the more damage a single accident can

do to your record.

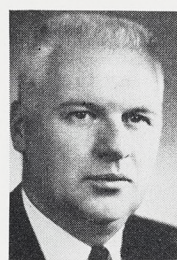
"The Palmdale facility, for example, only had two lost time injuries all year, but because its total man-hours was relatively small its frequency rate for the year was 5.00."

Northrop Norair continued to improve its record in 1965, posting a 1.15 frequency rate, or a little more than one accident per million man-hours worked. In the past three years, Norair has climbed from 11th to 4th place in the aircraft assembly and manufacturing category.



## Bruce MacDonald Succeeds Perego In Corporate Post

Bruce MacDonald, manager of Northrop's central regional office at Dayton, Ohio, has



Mr. MacDonald

been appointed corporate director of domestic marketing operations, Glenn R. Lord, vice president of Marketing, has announced.

He succeeds Frank S. Perego, who recently was appointed manager of Marketing for Northrop's Norair Division.

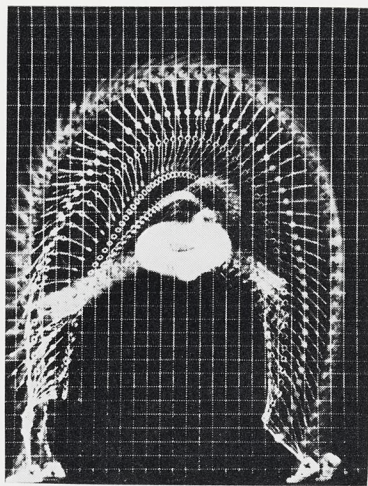
Mr. MacDonald has been manager of the company's Dayton office for the past four years. He joined Northrop 11 years ago as an engineer. He is a graduate of the University of California school of engineering. He served as an officer in the U. S. Air Force in World War II and during the Korean conflict.

## Page to Consult Firm On Italian Station

Page Communications Engineers will serve as consulting engineers in the preparation of procurement specifications for electronic subsystems to be incorporated in a high-capacity satellite communications ground station in Fucino, Italy. Page also will evaluate the equipment and establish quality control guidelines.

The station will be built by Societa Telespazio of Rome for use with the global satellite communications systems planned by INTELSAT for operation by 1967-68. Telespazio is already active in satellite communications with an experimental ground station at Fucino now working with the Early Bird satellite.

Page designed and built the highly advanced Gemini UHF communications stations for the U.S. Air Force at Grand Bahama, Antigua and Ascension Islands. Page is also the developer of a transportable satellite communications Earth station to be used by Comsat Corporation and the Overseas Telecommunications Commission of Australia to provide communications and data acquisition for the Apollo Manned Lunar Landing Program.



Backflip on Northrop Space Laboratories' lunar gravity simulator looks like this in photo taken with NSL's special biomechanics data camera. Rotating disc shutter helps capture series of motions on one film frame for motion dynamics research.

## Rotary Show Prizes Won by Venturans

An orchestra including two sons of a Northrop Ventura employee, and a mezzo soprano who works at the Division, won first and second prize as performers during the 1966 Rotary International variety show in Thousand Oaks.

The Serenaders, an orchestra of grade school boys, includes Steve and Rick Still, 14 and 12 years old, sons of Henry Still, head of Division Public Relations. The orchestra's first prize was \$200.

Steve plays lead trumpet and Rick lead saxophone.

Lupe Zuniga, secretary to Chuck Merlian, won the second prize of \$150.

Headed by music teacher and arranger Eddie Allen, the band will save the prize toward a trip to a music festival at Lake Tahoe this summer.

## Recipient of Gifts Dies in Vietnam

James R. Reilly, 19, nephew of Northrop Ventura employee Lillian Reilly, has died a hero in Vietnam.

Marine Private Reilly smothered an enemy hand grenade with his body to save the life of a foxhole mate he hardly knew.

Mrs. Reilly, of the Electrical branch, Production Operations section, joined other Division employees early this year in sending packages to servicemen in Southeast Asia, including her nephew Jim.

## AD ASTRA PER ASPERA

# National Association Elects Chuck Shelly; NSL's Christensen Heads Local IES

C. P. "Chuck" Shelly of Nortronics Hawthorne was installed early this month as president of the American Association for Contamination Control, a national organization he helped found five years ago.

Mr. Shelly and other AACC officers were installed at the conclusion of the Fifth Annual Technical Meeting held in Houston, Texas.

Serving two years as a regional director, two years as a national director and for the past year as executive vice president, Mr. Shelly has helped guide AACC from an initial membership of 30 to a present force of over 1500 in just five short years. He has been especially active in promoting standardization and specification definition for environmentally controlled facilities throughout industry.

In addition to his duties as a general supervisor in Operations at Nortronics, Mr. Shelly has helped guide and counsel on the subject of clean rooms throughout Northrop.

Going international with controls on man's contamination problems, and the development of material and criteria for university degree courses are two key efforts Mr. Shelly would like to see accomplished through AACC guidance during the coming year.

In his acceptance speech at Houston, Mr. Shelly said:

"The expanding complexities of our chosen discipline must forever be our basic concern—we are an organization that must in dynamic fashion, disseminate its educational and knowledgeable benefits with imagination and clarity, unmistakably encased in a cloak of service."

\* \* \*

## ENVIRONMENTAL SCIENCES

A Northrop Space Laboratories engineering specialist has been elected president of the Los Angeles chapter of the Institute of Environmental Sciences.

Mark Christensen, who is a member of the Northrop team supporting Jet Propulsion Laboratory on the Mariner program, was installed as head of the Institute's largest chapter April 4 at the Cockatoo Inn in Hawthorne.

The Institute, comprised of specialists in environmental testing, was founded in 1957 as the Society of Environmental Engineers. It was merged in 1959 with a related east coast society, at which time the combined organizations took the present name.

Mr. Christensen was a member of the founding group on the west coast in 1957 and has served in at least one office each year since that time. For the past three years he has been program chairman.



Mr. Shelly



Mr. Christensen

The Institute now has 27 chapters throughout the United States, with 1700 active members.

Its annual national convention begins today in San Diego and runs through Friday.

\* \* \*

## DATA INTERCHANGE

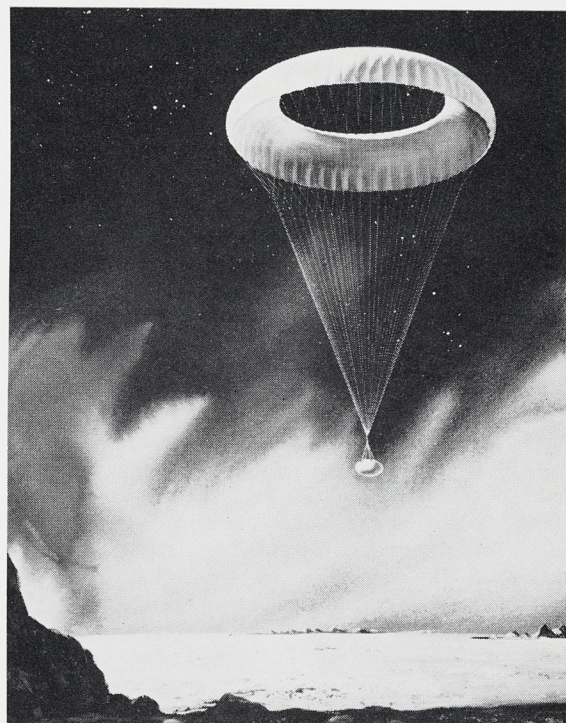
Northrop's David Kessler will serve as chairman of the Fourth National Interservice Data Exchange Program (IDEP) Conference set for April 20-22 at the Waldorf-Astoria Hotel, New York City.

Expected to draw delegates from industrial and defense organizations across the nation and Canada, the conference is aimed primarily at providing the latest information and advancements in the field of data interchange, Mr. Kessler reports.

Mr. Kessler, supervisor of Design Support and Reliability Engineering at Nortronics Anaheim, serves as Northrop's IDEP representative. He is currently a member of the IDEP Contractor Advisory Board, the national representative of the Contractor Data coordinator to government agencies and industry.

Key speakers expected to take part are: Major General Allen T. Stanwix-Hay, special assistant to the Assistant Secretary of Defense, Intelligence and Logistics for Southeast Asian

(See AD ASTRA, page 7)



Unmanned soft landing on Mars may look like this, with large annular parachute from Northrop Ventura protecting scientific instruments in oval space capsule from impact. Concept is most promising of several envisioned by Ventura Division after studies in connection with NASA's Voyager program. Concepts were described by R. N. Worth at a recent "Stepping Stones to Mars" meeting sponsored by the nation's two leading astronautical societies.

## MOVES TO NEW FACILITY

# Astro Tech Expanding as Page's West Coast Division

Astro Technology, west coast division of Northrop Page Communications Engineers, is engaged in an expansion program which is expected to include a threefold staff increase this year.

Highly specialized in tracking, telemetry and command techniques, the Mountain View, California, operation recently expanded its capabilities by acquiring the assets and personnel of the Alpar Corporation of Palo Alto.



Mr. Keyes

The acquisition, known as the Astro Structures Operations, "will add greatly to Astro Technology's expansion program by augmenting the company's capability in the design, manufacture and installation of antenna structural components," according to General Manager J. C. Keyes.

Astro Technology was formerly a subsidiary of Page Communications, Northrop subsidiary based in Washington, D.C. It was made a division late last year.

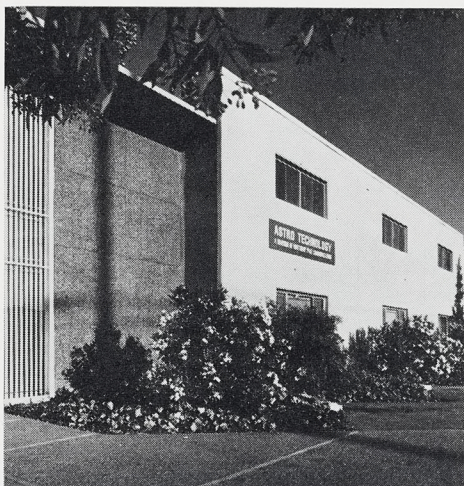
Astro Technology announced last month that a \$240,000 contract had been awarded by Dynatronics, Inc., to deliver and install support equipment for Pacific Missile Range tracking antenna systems.

Other major programs in progress include modification of a telemetry tracking antenna at Pretoria, South Africa, for the U.S. Air Force Eastern Test Range, and delivery of two telemetry acquisition systems to the U.S. Army at White Sands Missile Range, New Mexico.

Astro Technology is also under contract to the Naval Ordnance Test Station at China Lake, California, for a digital data system for instrumentation radars and for a program of analysis

directed to missile warhead effectiveness.

A major target in expanding its technical capability is large scale programs



New home of Astro Technology, west coast division of Northrop Page, is at Mountain View.

concerned with data acquisition, timing and control equipment, and diversification into the fields of medical electronics and underwater communication and instrumentation.

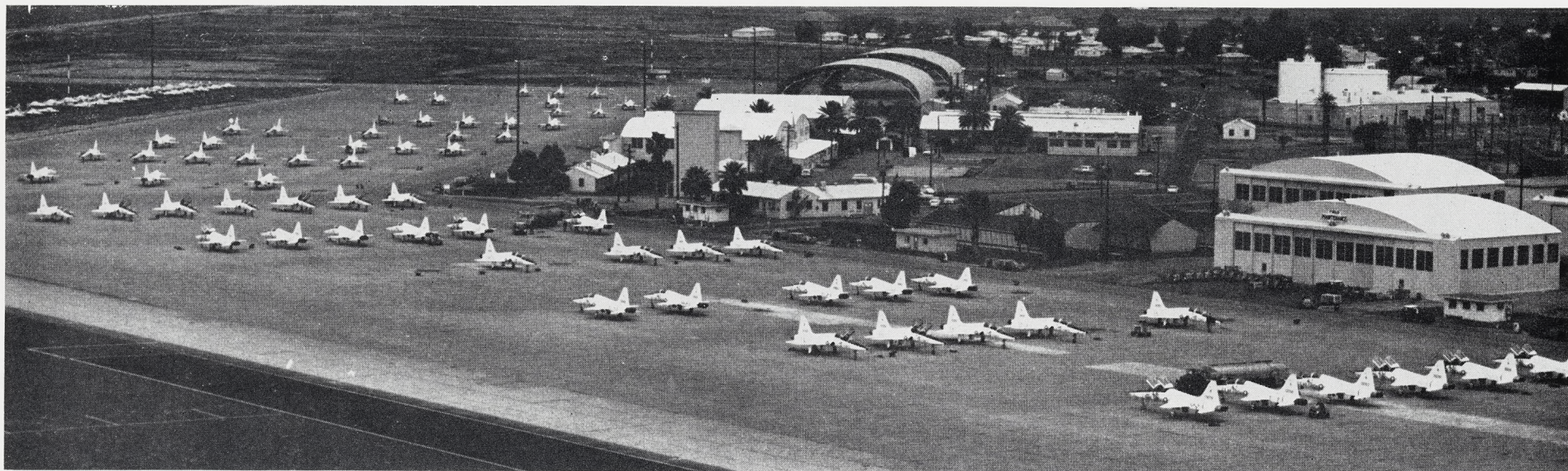
To accommodate expanding laboratory and manufacturing requirements, Astro Technology was recently relocated from Palo Alto to a new facility in Mountain View.

Founded in 1961, the company was acquired by Northrop Page in 1963 as a wholly-owned subsidiary.

In 1964, Astro Technology won a competitive program to provide a wide-band telemetry tracking antenna for the U.S. Navy Electronics Laboratory, which uses the antenna to acquire data from weather and meteorological satellites.

Mr. Keyes, one of the company's founders, is a vice president of Northrop Page as well as chief executive officer of the division.





Northrop-built T-38 trainers form impressive scene (above) on flight line at Williams Air Force Base, Arizona. Student pilots (left) march by parked aircraft during graduation ceremonies. And 11 sleek trainers (right) bank for a turn as student pilots receive initial supersonic training.



### 650,000 FLIGHT HOURS

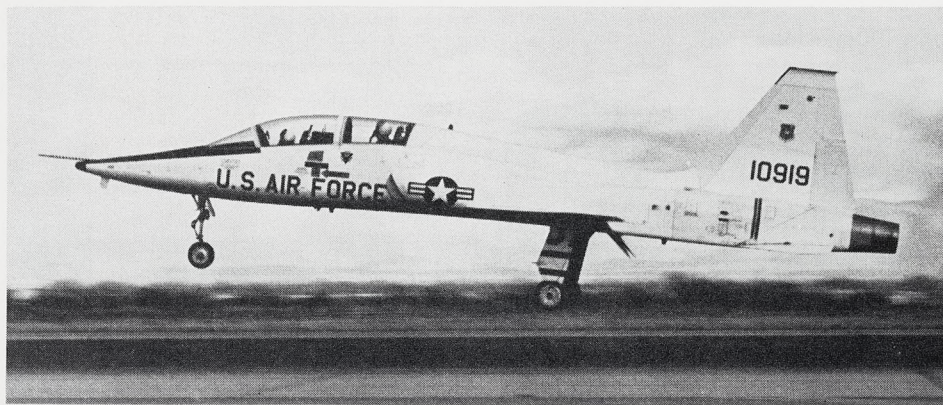
## The T-38 Five Years Later: Still the Safest Jet in the AF

Just five years ago this month the U.S. Air Force Air Training Command began a program of student flight training in the new Northrop-built T-38 trainer aircraft and class 62F went on to become the first USAF group of student pilots to fly at supersonic speeds before earning their wings. Since then, nearly 3700 Air Force pilots have completed their training in this 800-mile-an-hour airplane which has logged a total of approximately 650,000 flight hours in the service.

The advent of the Century Series (F-100 through F-106) supersonic fighter aircraft into the Air Force had made it necessary to provide pilot trainees with a supersonic trainer aircraft to bridge the gap between these new fighter airplanes and the slower trainers then being used.

The T-38 was especially designed for safety by a team of USAF and Northrop engineers working together. The care exercised in the airplane's original designs have been reflected in its remarkable safety record during its five years in the USAF. For this period the T-38 has achieved the leading safety record for any supersonic aircraft in the Air Force. Last year the twin-engine trainer's accident rate was a very low 3.8 per 100,000 flight hours.

The 645th T-38 is being delivered by



Northrop to the USAF this month with Craig Air Force Base, Selma, Alabama, scheduled to become the ninth ATC base to utilize approximately 80 of these airplanes in its training program. Sheppard AFB, Texas, recently announced as the base for German Air Force flight training beginning this fall, will also employ T-38's in its flight program.

Students at Williams AFB, Arizona, currently fly T-38's at a rate of more than 3800 flight hours per month, which is the highest for any USAF base. There are 85 of these aircraft at Williams with approximately 400 students from Germany, Saudi Arabia, Morocco, and the U.S. now in training there.

It is anticipated that the total number of flight hours at this base will increase to approximately 5000 per month, beginning in July of this year.

In addition, The Federal Republic of Germany is programmed to receive 46 of the Northrop trainers while the U.S. National Aeronautics and Space Administration is utilizing 15 of the aircraft with nine more scheduled to be delivered by the end of next year. The Strategic Air Command is using eight and the USAF Systems Command 20.

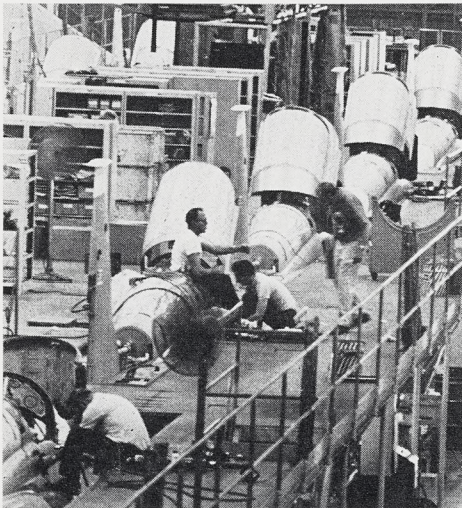
Northrop's Norair Division was first awarded a contract by the USAF in 1956 to develop the T-38. The Air Force had only subsonic training aircraft and an increasing need had arisen

to augment the use of the comparatively slow existing trainers with a new supersonic training airplane. The Century Series of fighter aircraft were then entering the USAF with first delivery dates ranging from 1954 to 1958. A more logical flight training sequence between trainer and combat aircraft led to the development and manufacturing of the T-38 at Northrop's Hawthorne facilities.

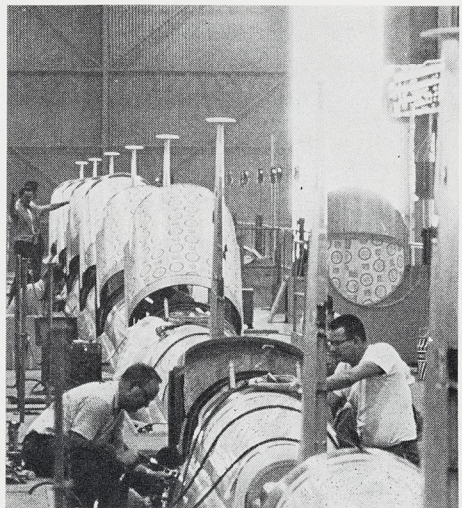
The T-38 demonstrated its outstanding safety characteristics even before it was made available to Air Force student pilots in 1961. In 1959 it became the first supersonic aircraft in the USAF's history to complete its flight testing without a major accident. The T-38 was first flown in April 1959 at the Air Force Flight Test Center, Edwards AFB, California, and subsequently went on to accumulate more than 9000 flight hours in USAF's ATC service without any mishap serious enough to affect a major system of the aircraft.

When the ATC made the decision to have a supersonic training airplane developed, in the early 1950's, it was realized that along with the many operational advantages of training in a faster-than-sound aircraft and the closer alliance which would be formed with the Air Force's jet fighters, the new

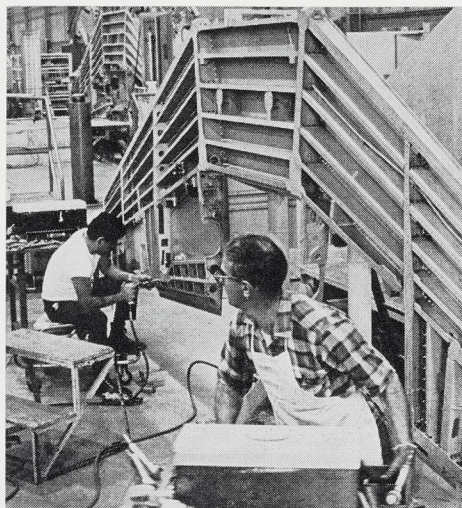
(See TALON, page 6)



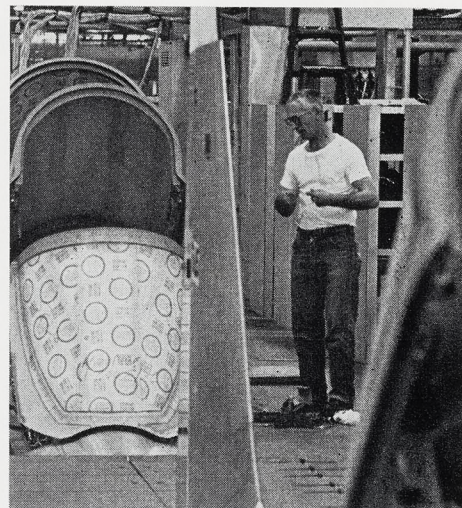
There's no fanfare on the T-38 production line on the plane's fifth birthday. It's business as usual



for F. J. Theroux, Al Graman, Stan Hunter, Jack Harris, W. B. Gonzales, L. T. Leon, Jim Prebor,



and Eddy Lumaye (from left to right in above four photos), and the hundreds of other men and



women who have built the safest supersonic jet in the Air Force inventory for five years.



# Moon Vehicle Studied for Earth Use

Northrop's Norair Division, including Northrop Space Laboratories, is best known for its aviation and space programs. But a host of terrestrial vehicles are part of the Division's inventory of ideas.

From earth application of concepts developed for the Lunar Roving Vehicles to 200 mph trains, Norair has at least a passing interest in earth surface transportation devices.

The Lunar Roving Vehicle suspension employs a unique walking beam system invented and developed by Bill Sponsler of NSL. It is also being considered for use on terrestrial Hi-Mo (high mobility) vehicle.

The LRV has eight wheels attached in pairs to the ends of four walking beams. Each beam is mounted to the body at a pivot point near the beams' center.

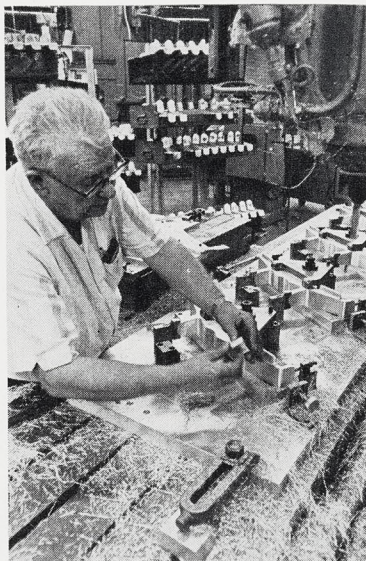
One beam fits on each end of an axle. As the angle of the beams relative to the surface is changed by the operator, the wheels move up or down.

On the model the walking beams are individually controlled and powered by 12 volt d.c. motors. Each beam can be driven to any desired position or locked in any position with either both of its wheels or one in contact with the ground. The beams can be left free with the wheels following the contours of the terrain.

Mobility provided the vehicle by the eight-wheel suspension includes pivoting in place, bridging crevasses or obstacles unpassable for other vehicles, or climbing 70 percent hard-surface slopes. Ground clearance is at its best when the four beams are vertical and only four wheels in contact.

In sand, snow or mud, the beams can be continuously rotated through 360 degrees. The wheels alternately come in contact with the terrain, "walking" Hi-Mo out of the region of poor traction.

Using its own ramp, the walking beam vehicle can over- (See **VEHICLE**, page 7)



Machinist Ed Bubla of Nortronics Anaheim checks progress of work on T-38 seat brackets being turned out in Wilson profile machine.

## Page Wins Contract For AF Terminals

Northrop Page Communications has been awarded a \$2.9 million contract by the Air Force to design and furnish six tropospheric scatter communications terminals to the Oklahoma City Air Materiel Area.

Based on an original design concept by Northrop Page, Washington, D.C.-based subsidiary, the terminals are air transportable and can be readily placed in operation anywhere in the world. Their mobility provides the Air Force an efficient and rugged tactical communications systems.

## Latest Theatre Party To See Zhivago

Another popular all-Northrop theatre party is slated for 8 p.m., May 15 at the Hollywood Paramount Theatre for the showing of Doctor Zhivago.

Through NRC sponsorship, regular \$3.50 logs and \$3 orchestra seats will be available for \$3 and \$2.55 respectively. Tickets may be obtained through all Northrop ticket outlets.

The winner of five Golden Globe Awards and nominee for 10 Academy Awards, including best film, Doctor Zhivago is an adaptation of Boris Pasternak's novel. It features an all-star international cast.

## AFTER COMPLETE TEARDOWN

# Test T-38's Back Together Again

Northrop Corporation has returned to the Air Training Command two T-38 Talon jet trainers involved in a unique test program carried out at Northrop Norair.

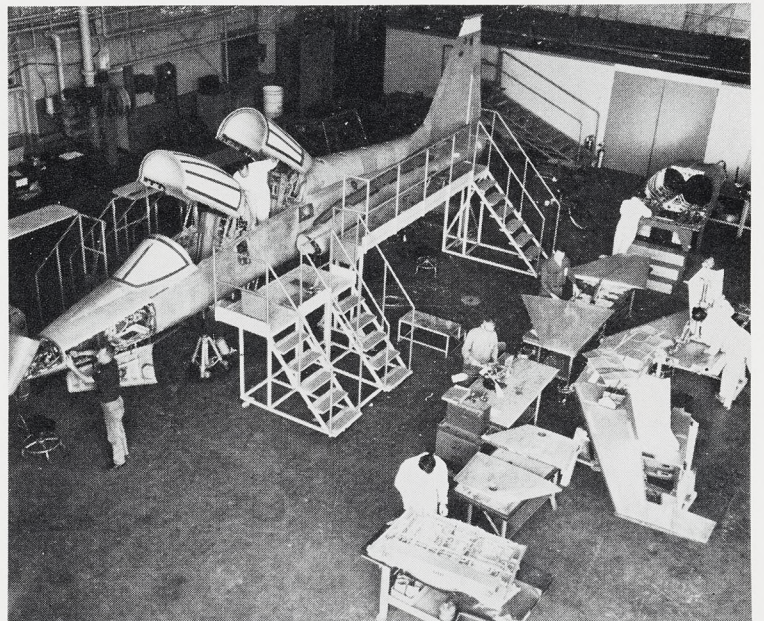
Following a complete disassembly and thorough non-destructive test effort, the aircraft were re-assembled, repainted and flown back to Reese Air Force Base, Texas. One was delivered late in 1965, the other early this month. Norair carried out the program under contract to the Air Force's San Antonio Air Materiel Area.

The aircraft were first carefully taken apart, piece by piece, before beginning the unusual laboratory safety test program. The findings of the program are anticipated to benefit future operations of the more than 650 T-38's now in service with the USAF.

The two aircraft chosen for the tests had each been flown a "high hour" total of 1650 hours by the ATC and were in good condition when they were returned to Northrop for the project, considering their lengthy service.

The T-38, for years the safest supersonic airplane in the USAF, has established safety records for all aircraft of this type in the USAF inventory since 1961, when it first entered the service. The rigid test program recently concluded at Northrop on the two T-38's, was an "ounce of prevention" operation set up to discover even the most minor kind of flaws, existing or potential, which could affect future operations of the other T-38's now in service. Close scrutiny of all control and structural assemblies of the two aircraft as well as X-ray tests of metals and connecting components were a part of the over-all tests.

All electrical wiring and components were put through high voltage tests. Wing structures and honeycomb panels were thoroughly X-rayed. Dyes were sprayed on various parts to re-



**TOUGH TEST**—Air Force T-38 jet trainer undergoes almost entire disassembly and inspection at Norair after 1650 flight hours. Nose wiring and controls in cockpit are checked at left while horizontal stabilizers, nose wheel, wing tips are laid out at right. Eight months of exacting laboratory testing was completed under contract to USAF San Antonio Air Materiel Area.

veal even the most minute cracks in the metal. Airframe hulls were completely stripped of all sealants and given a variety of tests. The team of experts assigned to the project became intimately familiar with even the rivets, screws and connections of the aircraft. Exacting wear measurements were made on critical components and systems and detailed findings were catalogued into groups of meaningful figures.

When the two airplanes were turned back to Northrop last year by the USAF for this program, they went first to the company's assembly facilities in Palmdale for functional test flights. In this phase, their performances were compared with those of later T-38 production aircraft.

Following special systems tests at the Palmdale facility, the two airplanes were then stripped of all paint and markings and trucked to the Northrop Hawthorne plant. Here every part and system, not permanently fastened to the airframe, were removed for the nondestructive tests.

To facilitate testing in their

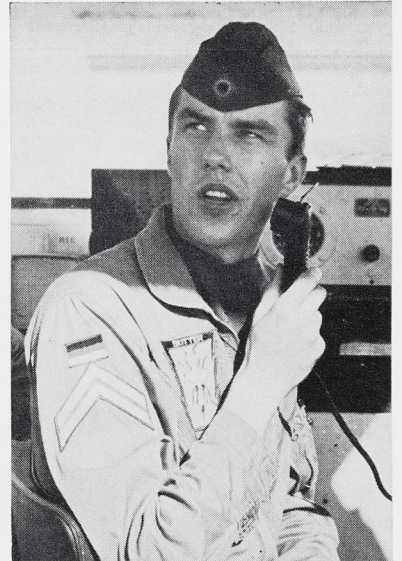
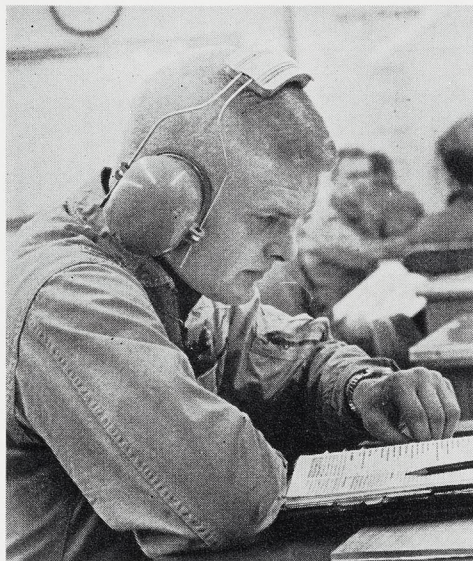
extreme "broken down" state, the two aircraft were separated into the following major individual components: forward fuselage, wings, aft fuselage, seats, horizontal tail, nose landing gear, wing tips, and speed brakes.

A 10-man experienced production crew, consisting of electricians, mechanics and other specialists, has been continuously assigned to the project, from the disassembly to the inspection and reassembly phases.

The first of the two T-38's was returned to Palmdale, where it was repainted and put through standard flight acceptance tests. It was delivered back to the Air Force near the end of 1965. The program results for both aircraft will continue to be relayed to the USAF for followup use in the field.

The second of these airplanes was reassembled and returned to the USAF last month and the results will be effectively utilized by the Air Force in maintaining the nearly 700 T-38's now in service with ATC.

## GERMANY'S STUDENT PILOTS FIND ROOM TO SPREAD THEIR WINGS



German Air Force student pilots will begin training in greater numbers in the United States this year, according to Lieutenant General William W. Momyer, commander of Air Training Command. Recently signed contracts between the United States and the Federal Republic of Germany call for establishing an undergraduate pilot training school at ATC's Sheppard Air Force Base near Wichita Falls, Texas. The basic contract covers the first year of a minimum five-year program. Prior to this contract taking

effect German pilots are training at Williams AFB, Arizona, where the above photos were taken by Northrop photographer Bill Cox. Of the 93 aircraft ordered for the new training program, 46 are Northrop T-38 Talons, the 800-mile-per-hour trainer which has had the most outstanding safety record of all USAF supersonic aircraft during the past five years. In the photo at left a German student pilot bones up on his hardware with the help of an elec-

tronic translator. Briefings and de-briefings (center) occupy a large part of a student's time. While a German student pilot is in the air, it is required that a fellow countryman be in the control tower (right) at all times to prevent a language mixup. When the first class begins at Sheppard, later this year, training will be similar to that given USAF pilots. This includes 132 flying hours in the Cessna T-37 primary phase jet aircraft and 130 hours in the super-

sonic T-38. An additional 349 hours of classroom instruction will be given. Benefits of the program to the U.S. includes considerable relief to the balance of payment deficit. The German Air Force will pay tuition to the U.S. at the rate of nearly \$10,000,000 annually plus an initial equipment purchase of \$42 million. Training in the Southwest U.S. permits the German AF to overcome the inclement weather and air space saturation problems common throughout western Europe.



## A DAY FOR NOSTALGIA

## Airport, Northrop Share Common Memories

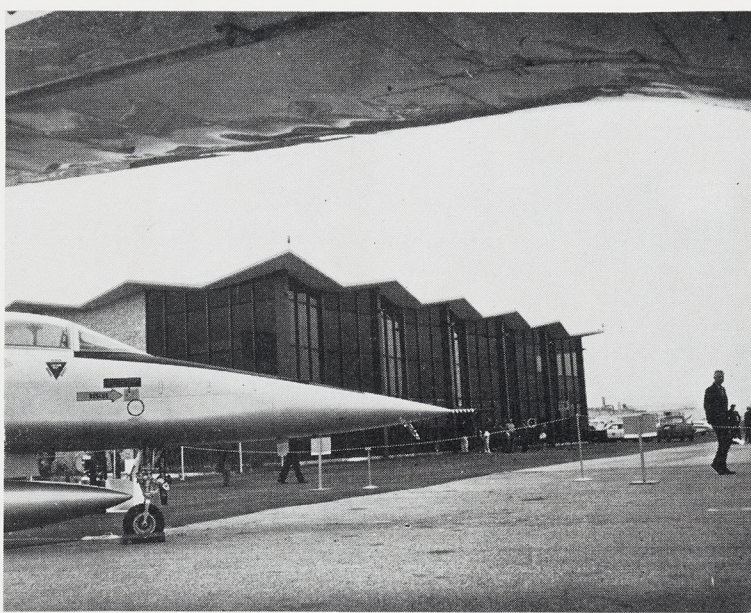
Nostalgic memories were very much with veteran Northrop Corporation employees attending the opening of Hawthorne's new airport terminal recently for Northrop and the airport literally grew and developed together. They are, to many, synonymous.

Northrop broke ground for its first facility in Hawthorne in late 1939 and planning progressed for an airport. By late 1940 the U.S. Army Corps of Engineers and the Works Progress Administration were busy building a main strip and taxiways. On June 19, 1942, the work was completed and Northrop contracted to operate the facility. It became Northrop Field. In April 1948 the City of Hawthorne assumed control and Hawthorne Municipal Airport was born. The original main landing strip was 3900 feet long, but was extended to its present 5000-foot length during World War II.

Roy Wolford, like a lot of Northrop old-timers, always links the early field with, of all things, asparagus.

"The area was once an asparagus patch and for five years, despite repeated attempts to kill it, asparagus would shoot up between the strip and taxiways," Mr. Wolford said. "The jackrabbits came from miles around to feast on it and created another hazard. I remember men going out and chopping it down to prevent it catching fire from engine exhausts."

Ed Freitas was Northrop's first ground-based radio operator. His original facility was an old



MODERNISTIC PAIR—Sleek Northrop F-5 stands on static display before sweeping new administration building at Hawthorne Municipal Airport during open house ceremonies April 2.

shack equipped with packing crates and an aircraft radio unit he converted for the job. Engineering was then responsible for control operations and Mr. Freitas would man his station after receiving a telephone call of a pending flight.

"Northrop added a room on stilts, all glassed in and equipped with regular ground radio equipment. We were really living then, until baseball season began," Mr. Freitas remembers.

He referred to a small baseball diamond used during lunch periods that was near the new tower. After a few well-hit baseballs

shattered glass windows, Maintenance added protective chicken wire to that side of the tower. "This led us to let out a loud crow anytime a ball hit and bounced harmlessly away," Mr. Freitas recalls.

When Engineering functions were relocated well away from the control tower, Mr. Freitas was given a bicycle to cover the distance.

"We all knew a flight was pending when we saw Ed Freitas peddling furiously in an eastward direction," said George Keenan. "When he was going west it was a sure sign things were back to normal."

Mr. Keenan is now an FAA watch supervisor at the Hawthorne Airport. But then he was one of the first official control tower operators hired by Northrop when this function was removed from Engineering. Mr. Keenan remained in this capacity with Northrop until Hawthorne took over the airport in 1948 when he took up his present duties.

"There were a lot of memorable flights out of the airport during those days and each attracted its share of spectators," Mr. Keenan said. "But I guess nothing quite like the flights involving the 'Flying Wing.'"

Max Stanley flew both propeller and jet versions of the "Wing"

on maiden flights from the airstrip. "People have asked me if getting such a big aircraft off a short strip was not a hair-raising experience," Mr. Stanley said. "It was really an easy flight and I have had more trouble with other types of aircraft."

While the Flying Wing was by far the most spectacular aircraft to operate from the airstrip, it had to share honors as the largest aircraft with the C-124 that called at Northrop to pick up Snark missiles. It, too, was a big aircraft.

In reviewing a long and harmonious Northrop-airport relationship, one fact stands out. Every Northrop-built aircraft, with the exception of current T-38's and F-5's, have made at least their maiden flight off what is now Hawthorne Municipal Airport.



The airport in 1965.

## Disneyland Tickets Put on Sale by NRC

Tickets for the annual "Northrop Night at Disneyland" gala sponsored jointly by all Northrop Recreation Clubs went on sale this week throughout Northrop facilities.

This year the event will be May 27, the Friday before the long Memorial Day weekend. The hours are 8 p.m. to 2 a.m. One ticket price (\$3.95 per person) entitles the holder to free use of all Disneyland facilities.

## City Airport Fights Trend, Moves Ahead

A standing room only crowd of more than 1000 persons turned out April 2 for the dedication of Hawthorne's new airport administration building.

They heard California Lieutenant Governor Glenn Anderson praise the city for its forward thinking in continuously improving one of the nation's 20 busiest airports in a time other cities are shutting down their airports across the state.

At one time there were 63 community airports in the Los Angeles area compared to nine today. Mr. Anderson reminded listeners. This has occurred at a time when private ownership of airplanes was increasing to its present all-time high of 20,000 light aircraft.

At a luncheon following the official dedication, Northrop Norair Administration Manager Tom McCarthy, the principal speaker, accepted the city's expression of appreciation for Northrop's long-term assistance with the airport project.

A healthy community such as Hawthorne is extremely important to Northrop's business and technical position in the aerospace industry, Mr. McCarthy said, in that it provides an environment favorable to recruiting and maintaining employees.

Singled out for special thanks during the luncheon, which was sponsored by the Hawthorne Chamber of Commerce, was Max Stanley, Norair's chief of Flight Support Operations and a member of the Chamber's Aviation Committee.

Mr. Stanley, former flight test pilot for Northrop, flew many of Northrop-developed aircraft in their maiden flights from the Hawthorne airstrip.

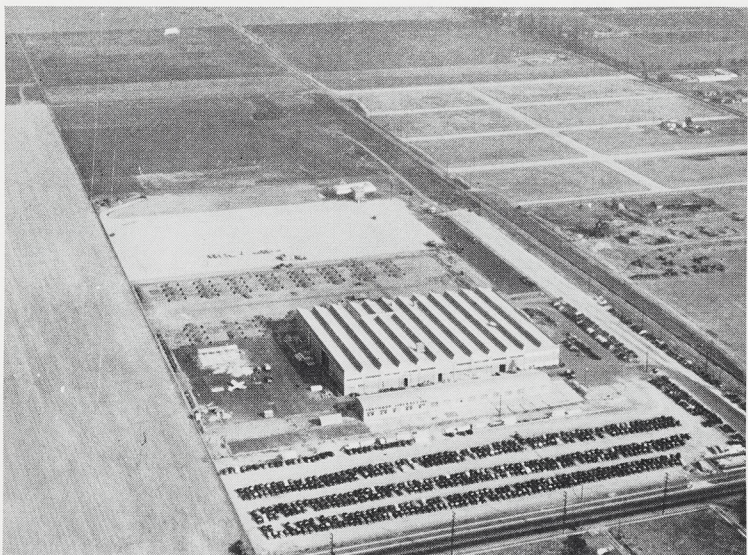
## NORTHROP NEWS

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ASPARAGUS HAVEN—Early view (1940) of Northrop Norair shows ground broken in left foreground for new airport. Once used to grow asparagus, area was plagued with same for several years.

## TALON: Designed With Safety in Mind, It Remains Unequaled

(Continued from page 4)

speedier trainer would also require certain very special new safety designs.

Many unusual built-in features were originally incorporated into the design of the T-38 and were implemented by a special USAF flight safety program developed along with the airplane to further assure it of being the safest supersonic jet in the Air Force. The care taken in this original planning continues to be reflected in the consistently leading safety record of the airplane.

The entry of the supersonic T-38 into the USAF inventory also created other advantages. It enabled the ATC to gear up its flight safety indoctrination program for the first time to supersonic flying orientation levels beginning with the student's primary training.

The T-38 is a two-place, high altitude, supersonic, low-wing, twin-engine jet-propelled aircraft with pres-

surized cockpits enclosed by individual jettisonable canopies. It has a tandem seating arrangement with zero altitude rocket ejection seats provided for both crew members.

The lines of the fuselage are characterized by "coke bottle" curvature at the wing junction point, in conformance with the "area rule" theory. Wings, placed toward the rear of the fuselage, just aft of the air scoops have a swept leading edge. The wing design allows the airplane transition to supersonic speeds without "tuck under" or "pitch up."

The two 7 to 1 thrust-to-weight ratio General Electric engines, equipped with afterburners, enable the T-38 to become airborne after a take-off run of just 2300 feet. The airplane climbs at a sea level rate of 30,800 feet per minute and can operate at a ceiling above 54,000 feet. It has been flown at nearly 900 mph.

To conceive the USAF's first supersonic training airplane a hand-picked ATC T-38 project team was appointed by the Air Force to work with Northrop. It was anticipated that this team arrangement, the first of its kind, would assure that the new aircraft would have performance capabilities similar to supersonic combat aircraft, economy of maintenance and operation, yet would retain the flying qualities consistent with safety requirements for trainer aircraft. The formation of the closely associated team composed of user and manufacturer personnel was an historic pioneering effort at that time. The success of the competent planning of this team's effort resulted in many outstanding innovations in the long and noteworthy flight accomplishments of the T-38.

Just 46 feet four inches long, with a wingspread of only 25 feet three inches, the T-38 is a small airplane

with the advantages of small, lightweight major components, such as engines, aft fuselage, and canopies. The removal of such equipment from a T-38 requires a much simpler type of ground handling equipment than is needed for heavier aircraft and waist-high working accessibility to vital components facilitates troubleshooting operations.

To give the T-38 maximum availability to its user it is equipped for exceptionally fast mission turnaround time. This is made possible by single-point refueling and minimum preflight inspection requirements.

Five years ago, when USAF ATC's basic pilot training class 62F became the first group of Air Force student pilots to train in the Northrop T-38's, the records show that during this training no major incidents or accidents occurred. This first class historically launched a continuing T-38 safety record for faster-than-sound aircraft that remains unequalled.



# Classified

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads. Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

## For Sale

**Home**, 3-bdrm., family rm., fireplace, 1 1/4 baths, lge. detached gar., 20x24 Doughboy pool w/concrete decking, 15 bearing fruit trees, covered patio, 80% loan commitment, \$31,500. Torrance, FR 1-2704. A

**Ford**, 1959 Galaxie 500 2 dr. h/top, r/h, p/b, p/s, p/seat, new tires, \$300. Rolling Hills Ests., 325-3057. A

**Piano**, Fairbanks, upright, mahogany, \$150. Box 701. A

**Karmann Ghia**, 1957, new brakes & battery, \$470. Pasadena, SY 8-3002. A

**Bicycle**, Deraillleur, 10-spd., \$40. Manhattan Bch., 372-6436. A

**Watch**, Elgin embraceable, 19 jewels, case, guarantee, waterproof, shockproof, \$40. Gardena, 327-0662. A

**Chevrolet Bel Aire**, 1956 4-dr. sedan, V-8, auto. trans., r/h, \$245. Fullerton, 714-526-4275. A

**Pups**, min. toy poodle, \$35 ea. Orange, 714-639-0325. A

**Surfboard**, Jacob's 9'6", clear foam redwood strip, \$85. Manhattan Bch., FR 4-6003. A

**Pup**, German shepherd, 10 mos. old, all shots, obed. trained, \$10. Garden Grove, 714-892-5450. A

**Coffee Table**, wrought iron, w/2 end tables, black & white tops, \$20. L.A., 645-6815. A

**Oscilloscope**, Heathkit, push-pull, extended range, model 0-5, \$45. Torrance, DA 6-8273. A

**Skis**, men's wood, safety bindings, \$10. Box 702. A

**Refrigerator**, Norge, w/deep freeze, \$65. L.A., 766-2809. A

**Range**, O'Keefe & Merritt, chrome top, griddle, broiler, \$50. Redondo Bch., 370-7967. A

**Ford station wagon**, 1959, air cond., p/b, p/s, Country Sedan, \$375. L.A., 474-3433. A

**Home**, in Running Springs, 2-bdrm., lge. paneled living rm., center fireplace, sunporch, bitins., 1-yr.-old, \$15,900. Wilmington, 834-4184. A

**Bunk Beds**, rock maple, w/ladder, 2 chests of drwrs, desk & chair, \$100. P.V. Ests., FR 5-4742. A

**T-Bird**, 1956, h/top, silver gray, recent o/haul, paint & tires, auto. trans., orig. owner, \$1275. Pacific Palisades, 454-2057. A

**Camera**, Nikon 35 auto., never used, set of wide angle & telephoto lenses, cost \$220, \$120. Box 703. A

**Speaker System**, deluxe 3-way, modern oiled walnut finish & contrasting grill cloth, 12" bass Woofer & a 3" dynamic Tweeter, matched & balanced by a 2-way crossover network, 25-16,000 cps. freq. response, \$25. Hawthorne, 676-6021. A

**Mobile Home**, Majestic, 10'x41', 2 yrs. old, close to Northrop, small down, balance \$50 monthly, \$4000. Hawthorne, 676-7387. A

**Plymouth**, 1959, 4-dr., 6 cyl., std. trans., r/h, seat belts, \$275. Redondo, FR 5-0915. A

**House**, 4-bdrm., family rm., 2 1/2 baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

**Cemetery Plot**, 4 spaces, endowment care, compl. developed, Glen Haven Sunny Slope sect., \$200 ea. Gardena, 324-7442. A

**Oldsmobile**, 1965, Delta 88, p/b, p/s, p/seat, air cond., r/h, w/s/w, GMAC financed, take over \$112 mo. pymnts., \$3500. No. Hollywood, 764-7131. A

**Stove**, 1965 Kenmore, gas, grill, dble. oven & broiler, 4-hr. timer, \$90. Hawthorne, 675-7953. A

**Autoette**, elec. 6-battery, ideal for invalid or elderly person, \$100. Redondo Bch., 370-0250. A

**Stove**, 1952 Kenmore auto., 30" w/storage space, lights, clock & elec. plug, \$20. Hermosa Bch., OR 0-7935. A

**MG-TF 1500**, rebilt. eng., wire wheels, Pirelli Cinturato tires, wood chrome steering wheel & trans. radio, \$995. L.A., 657-3074. A

**Truck & Camper**, Dodge, \$2000. Redondo Bch., 379-9278. A

**Cadillac**, 1952, 4-dr., \$225. Inglewood, 754-7947. A

**Broiler & toaster**, Everhot portable, elec., \$5. Hawthorne, OS 6-0041. A

**GTO**, 1964, h/top, 4-spd., posi-traction, mags, gauges, r/h, \$2200. Inglewood, OR 1-1351. A

**Chevrolet**, 1955, Bel Aire Deluxe, 2-dr., V-8, 40,000 miles, orig. owner, \$450. Culver City, 838-1242. A

**Honda S900**, 1965, low miles, extras, \$300. Manhattan Bch., 379-4581. A

**Stove**, elec., Admiral, \$30. L.A., 475-4347. A

**Stove**, O'Keefe & Merritt, 35" wide, w/full size oven, \$45. Gardena, 327-2279. A

**Accordion**, 120 bass La Scala, model 7432 TD, white, 8 mos. old, \$400. Culver City, 836-4934, 871-0999. A

**Own Your Own Apt**, 1-bdrm, kitchen, bitins, lge. glassed-in Lanai, lge. patio & pool, FHA 4 1/2% mortgage, \$99 mo., including maintenance, \$15,000. Hollywood, HO 7-9201, HO 5-5314. A

## For Sale

**Volkswagen** camper, Westphalia pack equipped, 1965, add'l. extras, 3000 act. miles, \$2850. Orange, 633-2258. A

**Rambler American**, 1958, less than 3000 miles on rebilt. eng., seat belts, smog device, \$275. Van Nuys, 787-8183. A

**Lots**, 2, Lake Isabella, \$1750 ea. or \$3200 for both. Gardena, 635-3127. A

**Chevrolet**, 1951, smog device, good tires, \$100. Gardena, 327-8047. A

**Home**, 2-story, lge. lot, close to school, Northrop & fwy., 2 full baths, bitins, 4 yrs. old, dble. gar., \$25,500 or \$200 mo. rent. San Pedro, 833-4749. A

**Acreage**, near Rosamond, in Antelope Valley, East Kern Water Agency dist., 2 1/2 to 10-acre parcels, \$595 acre. Torrance, FR 8-1026. A

**Refrigerator**, \$35. Torrance, 675-3836. A

**Bar**, knotty pine Salem finish, 4' lg. 1' wide, metal cooler, cutting board & foot rail, \$35. Inglewood, PL 6-6888. A

**Vacuum**, Kenmore Magicord, w/powermate attachment, 1 1/2-yr.-old, \$45. Hawthorne, 676-6122. A

**Motorcycle**, S-90 Honda, 2900 miles, 1965 model, \$325. Woodland Hills, DI 7-0303. A

**Income Property**, houses, 1 3-bdrm., 1 2-bdrm. & 2 duplexes on 1 lot, Inglewood area, my equity for \$1250, approx. \$52,000. Gardena, DA 9-3436. A

**Ford station wagon**, 1957, \$195. Manhattan Bch., 379-2649. A

**Stove**, Western Holly, gas, 36", w/broiler & griddle, \$25. Torrance, DA 9-3721. A

**Bicycle**, 20" boy's, Schwinn or Murray, \$12. P.V. Pen., FR 7-5853. A

**Falcon Futura**, 1964, 2-dr., 6-cyl., sedan, auto. trans., r/h, w/w tires, s/belts, 17,900 miles, \$1350. Hawthorne, OS 6-9175. A

**Dining Room Set**, Neva-mar, dropleaf table, 5 chairs upholstered, cocktail table w/center drwr., 2 matching end tables, wall shelf w/mirror, blonde, \$125. Hawthorne, 676-6625. A

**Hi-Fi Speakers & enclosures**, pr. 8", size 15" w x 11" d x 25" h., maple finish, handle 25 watts, \$25. Lakewood, ME 3-6346. A

**Mercedes-Benz**, 1965, 190D diesel, 4-dr. sedan, 30-42 mpg, fully equipped, r/h, w/w tires, \$600 for equity, \$3350. Ontario, 714-984-4660. A

**House**, 3-bdrm., bitins, burch cabinets, bltin TV/Hi-Fi area, raised fireplace, 500 sq. ft. playroom-workshop, 2 1/2 car gar., fruit trees, walking dist. to shops, 20% dn., \$27,250. Alhambra, AT 4-5698. A

**NSU Prinz**, 1959, \$150. Fullerton, 714-528-6914. A

**Porsche conv. D.**, 1959, Michelin X tires, new paint, radio, \$1650. P.V. Pen., 377-4268. A

**Wet Suit**, Farmer John, size small, \$20. Torrance, 375-6071. A

**House**, 4-bdrm., 3-bath, dining rm. & den, all bitins, on ocean front, \$1750 dn., \$35,000. San Pedro, TE 3-2512. A

**AM-FM phono**, Hi-Fi console, walnut cabinet, Hoffman recvr., Girard changer, Jensen speakers, \$75. Torrance, DA 3-8797. A

**Sailboat**, 26' Thunderbird, complete set of sails, boat bath & cover, extras, \$5500. Hawthorne, 675-4329. A

**Trailer**, 18', sleeps 4, shower, stove, refrig., cooler, \$1400. Redondo Bch., FR 8-2609. A

**Rugs**, Oriental, 3, 3'x5', \$30 ea. L.A., 477-0610. A

**Chevrolet**, Bel Aire, 1958 V-8, 4-dr., r/h, new brakes, tires, p/s, dyno-tuned, \$400. Anaheim, 638-5364. A

**Golf Bag**, 3 woods, 5 irons, \$25. Long Bch., GE 4-3169. A

**CB Transceiver**, 2-way radio, exec. model 100, includes mobile antenna, crystals, 110V & 12V plugs, locking bracket, \$135. Torrance, 325-3724. A

**Volvo**, 1959, w/1961 eng., new headliner & paint, chrome rev. rims, record player, \$525. Lynwood, NE 1-9322. A

**Truck**, 1955 Ford, 1 1/2-ton, 6-cyl., w/Sportsman camper, custom cab & Hydromatic, mirrors & spot light, \$395. Hawthorne, 370-9238. A

**Shotgun**, 12 ga. Ithica, 28" modified barrel, 5-shot pump, \$65. Hawthorne, OS 6-3365. A

**VW Conv.**, 1961, excel. mechanical condition, paint & uphol., \$950. Studio City, PO 3-1024. A

**Piano**, upright, \$70. Hawthorne, 679-2610. A

**Pups**, German shepherd, 10 wks. old, AKC reg., 2 males, 2 females, \$50. Hawthorne, 676-1441. A

**Wheelchair**, alum., demountable foot rests, \$25. L.A., AX 1-4523. A

**Camera**, 2 1/4 x 3 1/4 Crown Graphic w/101 mm Kodak Ektar & 200 mm Graphlex Tele-Optar lenses, Kalart range-finder, 2 roll film back attachments, \$125. Rolling Hills, FR 7-1732. A

**Piano**, upright, antique finish, \$100. Hawthorne, OS 5-7740. A

**House**, 2-bdrm., 160 x 55 lot, R-2, loan comit. \$13,600, \$16,000. Lynwood, 639-2398. A

**House**, 2400 sq. ft., fence, 4-bdrm., 2 1/2 bath, 2-car gar., 2 story, wood panel dining, concrete patio, \$39,000. Buena Pk., UN 3-2769. A

**Range**, elec., Westinghouse, coppertone 4-burner, auto. controls, 1 1/2 yrs. old, \$100. Gardena, 324-0274. A

**Chevrolet Biscayne**, 1961, 6-cyl., auto. trans., r/h, \$650. Inglewood, 678-1621. A

**VW 1200**, 1965, radio, s/belts, sway compensator, bumper stiffeners, w/w tires, 11,000 miles, \$1550. Hawthorne, 675-1366. A

**Dryer**, General Electric, 8 yrs. old, needs work, \$15. P.V. Pen., FR 8-1863. A

## For Sale

**House**, 2-bdrm., landscaped yard, 2-car gar., redwood patio, \$19,950. Hawthorne, OS 9-7674. A

**Volkswagen**, 1966, 1600 fastback, 44 actual miles, \$2300. L.A., 473-2585. A

**Go-Cart Chassis**, all welded steel, Ackerman steering, \$20. Anaheim, 774-2779. A

**Oldsmobile**, 1966, 6500 miles, mag wheels, vibrasonic radio, 4-spd., b/seats, \$2850. Brea, 529-6789. A

**Acreage**, 5 acres, San Jacinto-Hemet area, \$6000 dn., \$17,500. Lennox, 675-7621, DA 6-9267. A

**Ford Futura**, 1951, orig. owner, w/w tires, auto. trans., r/h, \$950. Inglewood, 672-6779. A

**Bedroom Set**, dble. size, mattress & box spring w/frame, bookcase headboard, matching blonde 6-dwr. dresser, \$85. Lakewood, ME 0-3888. A

**GTO**, 1964 389 cu. in. w/posi-traction, chrome rims, \$2200. Torrance 378-5924. A

**Austin Healey 3000**, 1960, hard & soft top, low mileage, \$1095. Manhattan Bch., 379-3826. A

**Cabin Cruiser**, 32' Hunter sedan, 115 hp Chrysler Crown, sleeps 6, radio, d/f, autopilot, dinghy, full covers, \$6100. San Pedro, TE 3-8903. A

**Horse**, reg. thoroughbred, gelding, 5 yrs. old, \$475. P.V., 377-7361. A

**Honda**, 1966 Super 90, extras, 1700 miles, \$325. Downey, TO 2-0656. A

**Volkswagen**, 1958, r/h, w/w tires, orig. paint, \$645. P.V. Pen., 377-4585. A

**Dodge Dart GT**, 1963, r/h, w/w, tint windshield, 2 extra tires, \$1200. Santa Monica, 394-3004. A

## Wanted to Buy

**Player Piano**, reasonable condition. Redondo Bch., FR 2-8254. B

**Couch** in good condition for under \$50. Torrance, 328-3492. B

**Analyzer & pistol timing light**, Sears automotive-type, must be reasonable. Torrance, DA 6-5558. B

**Unicycles**, for boy's 8 & 12 yrs. old. Torrance, 325-3548. B

**Rifle** .270 cal. with or without scope. Torrance, FR 5-8804. B

## Rentals Offered

**Cabin**, Green Valley Lake, \$35 weekend, \$60 wk. Torrance, 320-2002. E

**Apt**, 1-bdrm., bitins, pool, \$95 mo. Redondo Bch., 376-2117. E

**Apt**, 2-bdrm., bitins, closed gar., large closets, near Northrop, \$100 mo. Inglewood, PL 4-0351. E

**House**, 3-bdrm., 2-bath, dble. gar., \$175 mo. Torrance, 371-5694. E

**Apt**, 1-bdrm., bltin stove, closed gar., laundry facilities, \$89 mo. Gardena, 328-6955. E

**House**, small, partly furn., water paid, \$57.50 mo. L.A., PL 9-4391. E

**Cabin**, Idylwild, sleeps 4-6, \$22 weekend, \$55 wk. L.A., PL 4-5288. E

**Apt**, deluxe 2-bdrm., unfurn., lge. pool & patio, bitins, closed gar., near El Camino, \$115. Torrance, DA 9-5986. E

**Apt**, 1-bdrm., unfurn., bitins, pvt. patio, closed gar., hobby shop, hot water & trash pd., \$95 mo. Torrance, FR 5-0867. E

**Vacation Cabins**, Lake Gregory & Crestline, make reservations early for May thru Sept., \$25 weekends, \$60 wk. Venice, EX 1-2040. E

**Apt Townhouse**, new, view, 4-bdrm. or 3 & den, heated pool, entertainment pavilion, 2 1/2 bath, living rm., \$295 mo. Rolling Hills Ests., DA 5-5609. E

**Apt**, 1-bdrm., disposal, bitins, carport, 1 1/2 blocks from Northrop, \$95 unfurn.; \$110 furn. Lawndale, OS 6-5425. E

**House**, 2-bdrm., stucco, h/wood floors, tile kitchen & bath, near Northrop, \$105 mo. Hawthorne, 644-2002. E

**Apt**, furn., lge. single, 2 blocks from Norair, \$90 incl. utilities. Hawthorne, 675-8170. E

**Home**, 3-bdrm., 1-bath, No. Redondo area, lge. fenced yard, patio, play area, convenient to shopping & schools, 1 or 2 children OK, avail. May 1, \$120 mo. Redondo Bch., 379-6824. E

**Apt**, 2-bdrm., bitins, 2 children, play yard, fenced, \$100. Torrance, 320-2827. E

## FOURSOME

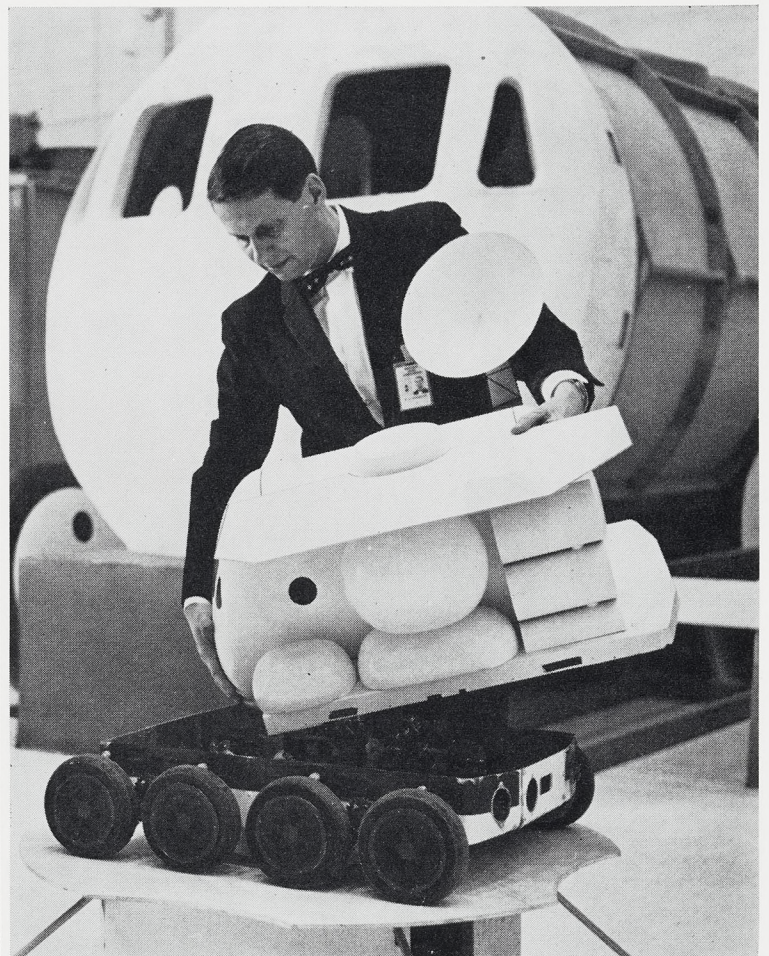
(Continued from page 2)

and its people in a short period of time," Mr. Peck said. "They really know the country and its people."

"Wherever these men went, we went, sharing everything," Mr. Lohry said. "I especially enjoyed a chance to chat with Mr. Jones and to know we share a lot of common goals—the best possible aircraft, on schedule and within costs. We each have a specific job to perform to make it possible. After what I saw and heard, I am really proud to know I am working for a winner."

Upon his return from Norway, Mr. Jones offered the following comments:

"We could not have selected more outstanding men to represent us than Messrs. Lohry, Minoletti, Peck and Rogers. They conducted themselves with natural dignity. Their discussions involving the F-5 indicate an intimate



**QUICK SWITCH**—Although not as easily as this, lunar vehicle including suspension developed by Bill Sponsler of NSL could find military application on earth. In background is full scale mockup of lunar vehicle.

## Rentals Offered

**Apt.**, 1-bdrm., furn., bitins, pvt. deck, lge. pool, sub. parking, near Northrop, \$137.50 mo. Lawndale, 670-6084, 679-2117. E

## Personals

**On behalf of the Leroy Fain family**, I would like to thank everyone for their assistance & kindness during our recent bereavement. BONNIE FAIR. L

**I wish to thank my many friends at Northrop** for their kind expressions at the loss of my mother. PEGGY WOOD. L

**My family & I would like to express our deep gratitude to our many Northrop friends for their thoughtfulness & consideration at the passing of my mother. MARY McKAY & FAMILY.** L

## For Sale or Trade

**Studebaker**, 1961 Lark, \$550 or trade for piano. Hermosa Bch., FR 9-7342. M

**Relax-A-Cizer**, cost \$400, \$200 or trade for TV. Inglewood, 674-1730. M

**Plymouth**, 1947 deluxe, good mech. cond., new upholstery, convt. floor shift, \$125 or trade for mina bike. Box 704. M

**Photo Darkroom Equip.**, enlarger, trays, tank plus many extras, \$100 or trade for good portable tape recorder. Box 705. M

**Tape Recorder**, VM Mod. 714, 2-spd. dual track, \$45 or trade for Colt, .22 cal., or Hi Standard pistol or rifle, .22 cal. pump or lever, preferably with scope. Box 706. M

**Mustang**, 1965 h/top, V-8, 289 cu. in., 4-spd. trans., p/s, extras, 8500 miles, \$2400 or trade for late model pickup. Torrance, 320-0210. M

## Going my way?

### Rides Wanted



## DEPOT

(Continued from page 1)

and material coordination.

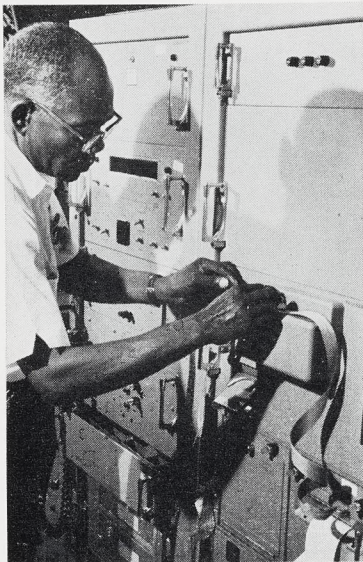
Because of its autonomous nature, the Polaris Support Depot has perfected and implemented operational procedures to cut across time-consuming and costly paperwork.

Further, it has, with Navy concurrence, helped pioneer unique methods for cost controls and materials procurement.

When the Polaris Support Depot began operating it performed under a "Level of Effort" Cost Plus Fixed Fee contract in its first two year's of activities. Because of Northrop's exacting attention to records and all related factors, it was possible (in 1964) to convert to a Fixed-Price contract system. That is, each repairable item is now covered by a pre-determined price. This leads to a noteworthy reduction in accounting, auditing and billing costs.

The obvious success of the Polaris Support Depot has not gone unnoticed in Navy circles. In fact, the Navy entered into a special contract with Northrop for assistance in establishing a similar system for its Module Maintenance Facility at the Charleston, South Carolina, Navy Shipyard.

Mr. Seeley and his staff, as well as Northrop Nortronics management, is justly proud of its record in this effort. It has, among other things, helped to shorten all lines of communication and to establish operational flexibility along with quick reaction flow times required in supporting the Polaris Program.



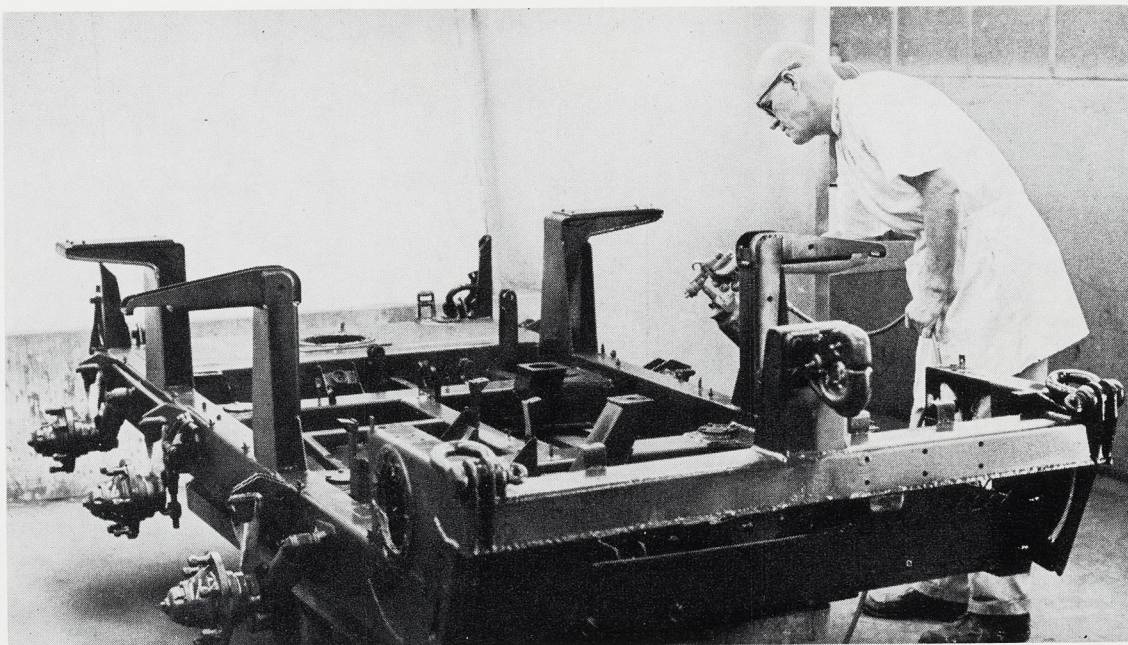
Noble Shadowens inserts tape into Mark 414 checkout unit in use as part of Northrop Nortronics Polaris Support Depot at Anaheim. Unit has been used to checkout vast majority of components, drawers and entire systems returned to depot as part of unique support program.

## NOW AT THE HELM



Quintet above was recently installed as officers of Nortronics Management Club for 1966. They are (from left) Ken Berry, sergeant-at-arms; Roland Gagon, vice president; Kathy Ruddy, treasurer; Pat Foster, president; and Dick Defussi, secretary.

## STRIPPED FOR ACTION



Nortronics Anaheim has continued to play important role in U.S. Army's Hawk missile program for many months. Launchers and loaders for Hawk program were originally turned out at Nortronics. Subsequent work has centered around regularly-scheduled modification work. Charlie

Skaggs, a recent retiree, paints stripped down Hawk loader in one step of modification. Units are disassembled and refurbished, then returned to like-new condition in regular cycle. Nortronics has received a letter of intent to purchase more than \$5 million worth of new equipment.

## LIGHT: Beyond the State-of-the Art

(Continued from page 1)

years there. He had been in charge of photo measurement work on rocket projects, and of processing test data for the Mt. Palomar Observatory 200-inch telescope.

His work at Nortronics led to a definition of the Division's needs in the light measurement area.

"We learned," Mr. Clark said, "that the sensors used in the trackers differed from those in our photometers."

"We had to come closer to the spectral characteristics of the stars with our simulated sources or the star tracking tests and calibration would have significant errors."

Mr. Crandell introduced the use of calibrated luminous intensity and radiant lamps from the National Bureau of Standards as the primary standard sources.

He initiated the use of color filters to shift the tungsten spectral emittance so it would more nearly match the spectral characteristics of stars within the sensors' spectral sensitivity region.

Now Nortronics light sources are calibrated by comparing them with the National Bureau of Standards lamps using Northrop methods and equipment.

The NBS primary light sources are ordered yearly. The Bureau calibrates these lamps both for luminous intensity and color temperature.

For use in the calibration procedures Mr. Crandell designed Nortronics' comparison pho-

tometer, a stellar photometer and a star-sky simulator.

The simulators are used as standards to calibrate not only Nortronics trackers but those of other firms as well.

The head of the Photometric

## Northrop Supporting JPL Mariner Effort

Northrop Space Laboratories will again provide on-site engineering services for NASA's Jet Propulsion Laboratory. Efforts under this latest JPL contract to Northrop, awarded February 15, will be performed under the direction of A. T. Kidd, JPL/Pasadena Operations program manager.

Mr. Kidd reports directly to Louis H. Brennwald, manager of NSL's newly formed Northrop Support Operations department. As recently as September 1965, Northrop personnel were involved in the Mariner flight to Mars. From 1963 to 1965, the company was part of the Ranger lunar investigation program.

Initially, the JPL contract will involve about 50 Northrop engineers in the disciplines of guidance and control, thermal control, and engineering mechanics for Mariner '67, Mariner '69 and other JPL space research programs. Mariner '67 will head for the planet Venus in a flyby next year and Mariner '69 will attempt to fly by Mars in 1969.

## Dancing Classes Still Have Openings

Students are still being accepted in NRC-sponsored ballroom dancing classes offered Thursday evenings at NRC Clubhouse, Hawthorne. The cost is \$5 per person for 10 weeks of instruction.

Students may select from Cha Cha (at 7:30 p.m.); western swing (at 8:30 p.m.); or rumba (at 9:45 p.m.).

## Lake Cachuma Site Of April Campout

Northrop Camping Club members will converge on Lake Cachuma April 23-24 for a regular campout.

Saturday evening those taking part will enjoy a weiner roast in lieu of the regular potluck dinner, NRC Commissioners Frank Byers and Earl Bird report.

Standards Laboratory, Mr. Clark, has been with Northrop, including Nortronics, for 23 years.

As project engineer on a large earth-moon simulator for the Ranger-Mariner program he was responsible for its design, assembly, calibration, test and administration of the project.

Mr. Clark holds several patents in the field of optical instrumentation and has published papers in the field of photometrics.

## 'Company of Year' Honors to Trivco

Company-of-the-Year honors have been bestowed upon Trivco, Northrop Nortronics-sponsored Junior Achievement firm in Anaheim.

Company was judged best among 16 firms taking part in Orange County JA Center. Judges were business leaders who considered business knowledge displayed by firm's officers and books and records showing firm's activities. Earlier, the Trivco company reached the finals after posting sales in excess of \$500 for the year and having better than 80 percent attendance at all meetings and sessions.

Tomorrow Trivco will be pitted against winners from four other JA centers in the greater Los Angeles area to name the top firm in the area.

This marks the second occasion in three years when a Nortronics-sponsored firm has won Company-of-the-Year honors.

## Mars Landing Data Updated At Congress

Parachute systems capable of soft landing unmanned space vehicles on the planet Mars were described recently by R. N. Worth, project manager of Planetary Landing Systems for Northrop Ventura. He reported upon detailed and continuing analyti-

(See photo on page 3)

cal studies being conducted in connection with the National Aeronautics and Space Administration's Voyager program.

His paper was presented during a three-day meeting—"Stepping Stones to Mars"—sponsored by the nation's two principal astronautical societies.

Under the Voyager program, NASA plans to send an instrumented vehicle to a soft landing on Mars for measurement of atmospheric and surface properties of that neighbor planet.

Northrop Ventura landing system studies have taken into account the latest estimates of the extremely rare Martian atmosphere. It is now believed the planet's surface air pressure is no greater than that between 100,000 and 150,000 feet altitude on earth. At the same time, a landing space vehicle may anticipate winds of 200 miles an hour with gusts up to 500.

## Tickets Go on Sale For Spring Dance

Tickets to an April 30 Spring Dance to be held at NRC Clubhouse, Fullerton, are now available throughout Nortronics West Coast facilities.

The Tune Launchers will provide music for the affair to start at 8:30 p.m. and conclude at 1 a.m.

Only 150 tickets (at \$1.50 per person) are available due to limited space. They are being sold on a first-come, first-served basis. Contact Personnel Activities for information.

## Women's Golf Club Plans Twilite League

Nortronics NRC Women's Golf Club at Anaheim is planning a summer Twilight League to meet Wednesday evenings, beginning May 18 at Brea Golf Course, Brea.

Deadline for entering is April 25. Contact Pat Richards, women's golf commissioner, at ext. 795, Anaheim, for information.



SMILES ALL AROUND—John Myers (center) receives \$115 Employee Suggestion award from Grant Gunderson, Nortronics chief of Production, with Foreman Bill Gramm looking on. Mr. Myers suggested improved method for drilling ailerons which saves 834 man-hours per year.



## New Vigicon To Display Satellites

Northrop Nortronics will produce a large screen information display system for satellite control at the Air Force Eastern Test Range Control Center, Cape Kennedy.

The dynamic data projection system will be the second built by Northrop's Nortronics Division for the new Air Force control complex, which is undergoing continuous expansion to enlarge its mission to include global operations as well as improve its capability for all elements of the Eastern Test Range.

The new system will be used exclusively to trace, on a screen approximately eight-foot square, the launch and orbital paths of satellites. It will be similar to the Northrop system currently in operation at the center which displays over-all range control functions, including missile tracking.

Utilizing Vigicon scribing projectors developed by Northrop Nortronics, both ETR systems can trace, in various colors, four different satellite or missile flight patterns simultaneously. Tracking station signals are fed directly into the plotting projectors for immediate display, while a reference projector provides appropriate screen background information such as an outline of the range or a global map.

Projection equipment is located in back of the screens, outside personnel work areas.



Command and control equipment shown, produced within Nortronics Space and Information Systems section, will be completely refurbished for Paris showing this summer. Discussing required work are, (from left), Mike Turney, director of section; Ross Chiles, chief, Command and Con-

trol; Al Vogel, chief, Weapons Status Reporting; Dave Conklin, chief, Tracking and Displays Systems; and George Friedman, chief, Systems Engineering. S. V. Edens, chief, Information Systems, was out of town when photo was made. Story on this group is on page 4.

## Nortronics Honors Veteran Employees

Long Northrop service will be recognized during April when four 15-year and eight 10-year service pins are presented Northrop Nortronics personnel at West Coast facilities.

Receiving 15-year service pins are William Kieffer, Dan Melara, Alan Ries and Billy Spafford.

Ten-year awards will go to Victor Hinojosa, Alan Steidley, Otto Decker, Samuel Wilson Jr., Richard Coffey, James Melatti, William Ellison and John Luzar.

## Carolina's Solid Rocket 'Throttles' Like an Auto

A contract for design, development and testing of a controllable solid-propellant rocket to power the U.S. Air Force Advanced Ballistic Reentry System (ABRES) has been awarded Northrop Carolina by Aeronutronic Division of Philco Corporation.

Under development for three years by Northrop's wholly-owned subsidiary headquartered in Asheville, North Carolina, the Free World's first controllable solid rocket (CSR) has already been fired successfully more than 225 times.

Prior to the Northrop development, there was no stop and

restart in solid rockets. The fact that the CSR can be "throttled" just like an airplane or an automobile engine, offers great promise for space applications and in low-gravity takeoff situations, such as on the moon.

The ABRES propulsion unit will be a CSR modified to provide precise attitude control simultaneously with periodic "pulse" firings through its main nozzle. The attitude control feature also provides control of roll, pitch and yaw.

"We have established beyond any doubt the feasibility of throttling over a wide range of thrust and of stopping and restarting an all-solid-propellant rocket system," A. Terrel Jones, Jr., manager of Ordnance Development and Test Operations, said.

"This is probably the first and only truly working solid-propellant motor that can be throttled or stopped and restarted on command. You don't have to pre-program anything."

The CSR was first fired—and successfully controlled—in the fall of 1963. Subsequent tests, conducted under contract to the Air Force Rocket Propulsion Laboratory at Edwards AFB, have brought significant refinements to the technique of solid propellant control.

The CSR has only one moving part—a valve that functions as a throttle. It can be stored for long periods before firing, more than five years, according to Mr. Jones. Its unit cost is low and its field-maintenance needs are minimal.

Northrop Carolina also developed the CSR's unique fuel and oxidizer propellants.

(See CAROLINA, page 6)

"Design staffs keep abreast of technological developments, incorporate contemporary design trends and select the best available estimate, according to Mr. Cox.

(See DESIGNER, page 6)

## MORE THAN SKIN DEEP

## Esthetics for the Aerospace Set

Beauty is more than skin deep where industrial design is concerned.

It begins with the innards of a product and ultimately defines what the exterior form becomes.

Such packaging designs by Ron S. Schwartz of Northrop Nortronics provide economy for the customer, as well as pride and pleasure for scientists, engineers and technicians operating the equipment.

Mr. Schwartz came to Nortronics in 1962 at the instigation of Clair Cox, then supervisor of Photometric Equipment Development.

Mr. Cox felt that Nortronics products should immediately be identified with the Division.

"I knew we could not only promote our reputation," he said, "but by allowing more time for application of industrial design principles, produce less costly and more efficient equipment."

Mr. Schwartz's first task, working with Mike Burke, responsible engineer on the project, was the redesign of a double-mirror heliostat already in existence at Nortronics.

While redesigning the device,

used to provide a fixed beam of light from the sun for research and development work, the designers estimate that elimination of one mirror along with the other design improvements reduced unit costs by more than \$4200, a con-



Concentrating on solar sensor being calibrated, Ron Schwartz adjusts mirror of Nortronics heliostat for which he provided industrial design. Once set, heliostat will track sun and keep beam of sunlight aimed at sensor.

## 'Unbeatable' NDC-1051 to Make Debut

The Nortronics Digital Computer (NDC) 1051 will make its debut May 16-18 at the National Aerospace Electronics Conference at Dayton, Ohio, under the banner "Northrop Nortronics: Leader in Low Cost Navigation Computers."

"When it comes to fully militarized computers, the NDC-1051 is the best in the world with respect to speed and versatility," says Ed Klein, chief of Computer Development at Nortronics' Hawthorne facility.

Under development at Hawthorne for more than a year, the multipurpose 1051 is a compact airborne device suitable also for scientific and commercial use. Its size, weight and versatility makes it applicable to space vehicles and limited command and control roles as well, according to Bert Swearingen of Advanced Computer Applications.

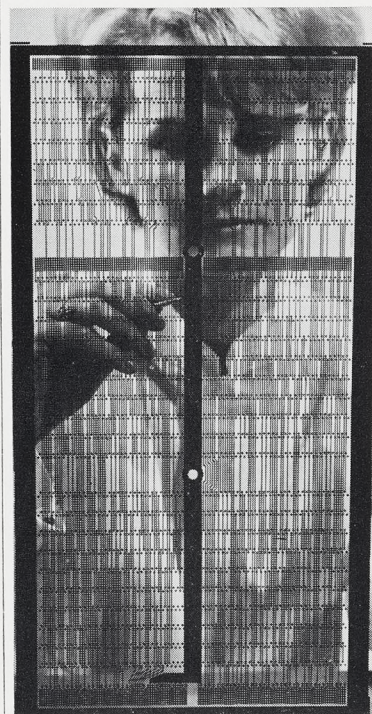
"Our hard-headed engineering approach to the 1051 now makes it available at a 50 percent cost saving over the nearest competitive computer," Mr. Klein said.

The low cost achieved is the result of computer mechanization techniques and design concepts developed by Walt Edwards, Computer Engineering Technical staff, which provided a unit that was production engineered from the beginning. This lends itself to highly automated fabrication techniques at the expense of additional initial engineering effort. No hand wiring is required in the major subassemblies.

"With the tooling we have developed for two prototype models, we could produce one 1051 a day after four to five months lead time," Mr. Klein said.

One of the prototypes will be the center of Northrop's display at the Aerospace Electronics Conference. A predecessor of the

(See COMPUTER, page 6)

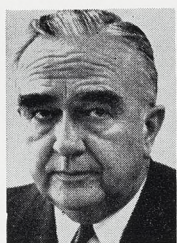


This is glass master which permits photographic transfer of etched circuit pattern onto the two NDC-1051 logic section carrier boards.



## FRINGE BENEFITS

## Group Insurance Today: Northrop Provides Medicare Plus



By WILLIAM LARRABEE  
Vice President—Industrial Relations

In an effort to clear up a lot of details before going away on a trip, I missed the deadline for an article in the last issue of the Northrop News.

After a great deal of discussion, we have decided upon the group insurance changes which I mentioned before and which will go into effect when Medicare starts on July 1. This was not an easy task. We wanted to get the best possible coverage for the money which would do the most good for Northrop people. There will be an announcement in our various plants before this article is published. Nonetheless, it might be well to go over some of the points briefly:

1. We have quite a number of active employees who work past the age of 65. These folks will get the same group medical benefits that any active employee now has, *except that* the Northrop policies will not cover anything provided by Medicare. These people must register for Medicare, therefore, or they will not have full coverage. Northrop pays the full expense for this Northrop benefit and will reimburse the employee for the \$3 monthly which he pays for the Medicare coverage. There will, therefore, be no cost to the employee.

2. Quite a number of active Northrop employees have dependents over 65. If the employee is carrying dependents medical coverage it will be continued just as before, *except that, again,* it will not cover anything reimbursed by Medicare. The employee's contribution for dependent coverage will be reduced by \$3 per month so that his dependent over 65 can be enrolled in Medicare without additional cost to him.

3. We recently put in our fine "Magic 85" formula and increased our benefits for people retiring between the ages of 55 and 65. These people who retire early cannot get Medicare until they reach 65. They must have good protection, however, in the meantime. A new Major Medical policy has been worked out for them which gives coverage up to \$5000 between retirement date and age 65 when Medicare becomes available. The retiree contributes \$4.67 per month for this policy and the company contributes \$4.67.

4. Lots of retirees have dependents under 65 who can't get Medicare either. The retired employee will be able to get coverage for these dependents under age 65 on the same basis as that available to retired employees under age 65 as described in paragraph 3 above. The retiree will contribute \$4.67 per month for the

covered dependent and the company will contribute \$4.67.

5. All of our retired employees over 65 will have Medicare available to them. It took us a long time to decide what medical insurance we really need at that age over and above the Medicare protection. It became pretty obvious as we sifted through everything that the expenses which hurt the most at that age are those for prescription drugs and special nurses. There will be a policy available for retired employees over 65 covering these two items up to \$5000. A retired employee who wishes this policy will contribute \$1.25 per month and the company will contribute \$3 per month.

6. Lots of retirees have dependents who are over 65 and who have Medicare available to them. The same policy (see paragraph 5 above) will be made available to retired employees for their dependents over age 65 as is available for retired employees over age 65.

7. Retiree benefits and retiree dependency benefits specified above are available to those retirees participating in the Northrop Group Medical program as of July 1, 1966 and to those personnel retiring after that date provided, of course, that eligible personnel enroll in accordance with company regulations.

One very important thing should be remembered in connection with all of these benefits. The Group Insurance Administration people plan to be in touch with each person affected by these changes not later than the middle of May. They may have some problems, however. For instance, the company does not know what eligible dependents are over or under 65 in many cases. To be safe, if you have not heard from the Group Insurance Administration office before the 1st of June, be sure to contact William Waldon at the Norair facility, extension 1210. The Group Insurance people will inform you as to policy details such as deductibles, accumulation periods, etc., and will answer any questions you may have.

On an entirely different subject, I would like to talk a little bit about United States Series E Savings Bonds. It is hard to even discuss savings right at the present time when we have all been hit so hard by all kinds of expenses. The first thing that jolted us was that most of us had to put up an additional \$100 this year for Social Security including Medicare. Of course, the company had to put up \$100 for each of us as well.

The next thing that came along was the increase in income tax deductions. As we all

(See FRINGE BENEFITS, page 5)

## CHAMBER PLANS ANNUAL VISIT TO NORTHROP MAY 4

The annual Hawthorne Chamber of Commerce Day at Northrop will be observed May 4.

This event, which brings top community leaders to call on Northrop, has become a traditional one in which both Norair and Nortronics Divisions participate.

It features tours of production areas, product displays and talks by key Northrop officials.

Tentatively scheduled to participate this year are such leaders as R. R. Miller, Northrop senior vice president—Corporate Relations; R. E. Horner, Northrop senior vice president and Norair general manager; Northrop Norair vice presidents Roy Jackson (NSL), Welko Gasich (Technical) and F. W. Lloyd (Operations); and Ross Miller, Nortronics vice president and Technical manager.

T. L. McCarthy, Norair manager of Administration, will serve as master of ceremonies.

### Few Tickets Remain For 'Dr. Zhivago'

A few tickets still remain for an all-Northrop theatre party to see Dr. Zhivago, winner of five Academy Awards, May 15 (8 p.m.) at the Hollywood Paramount Theatre.

Regular \$3.50 loge and \$3 orchestra tickets are available for \$3 and \$2.55 respectively, through NRC sponsorship. Validated parking is 50 cents.

Tickets may be obtained from all Northrop ticket outlets.

### Disneyland Tickets On Sale at Outlets

Tickets for an all-Northrop night at Disneyland May 27 (8 p.m. to 2 a.m.) remain on sale at all Northrop ticket outlets. Total price of \$3.95 entitles holder to unlimited use of facilities, plus general admission.



Edward T. Shedlock, president of AID-United Givers, presents check to Crippled Children's Society "poster boy," Billy John. The Society will receive more than \$107,000 from AID this year and is one of 12 participating causes to which AID distributes funds. Northrop's contributions to AID recently topped \$2.5 million for a 10-year period.

## Land Investment Lectures Planned

A unique series of lectures covering real estate investments will be presented at NRC Clubhouse, Hawthorne, for an eight-week period beginning May 17.

Open to all Northrop employees and their spouses, the series will meet each Tuesday (5 to 7 p.m.). The cost is a nominal \$10 for an individual or \$15 for a couple.

Scheduled to appear as guest lecturers are experienced and prominent leaders in all phases of real estate investment. They will cover such topics as general investing, tailoring a program to individual needs, factors influencing land values, land development, tax relationships, hazards and advantages of partnerships and joint ventures, and private, commercial and business property investments.

Printed notes covering each lecture will be distributed.

Reservations will be limited to the seating capacity of the NRC Clubhouse and are presently being accepted at Personnel Activities office at Northrop Norair only.

This is the first program of its type ever arranged by the Northrop Recreation Club.

## ANNUAL COMPETITION

# Eight Merit Scholarships Awarded at Six Locations

Six sons and two daughters of Northrop employees have been named winners of 1966 Northrop Corporation Merit Scholarships in the National Merit Scholarship Corporation's 11th annual competition.

Each will receive from \$1000 to \$6000, depending upon individual need, to cover four years of undergraduate study at the college of their choice.

Northrop's Merit Scholars for 1966 are currently enrolled in their final year of high school.

They are:

Carson E. Agnew, son of George E. Agnew, a Northrop Norair aeronautical engineer. Now studying at Webb School of California, young Mr. Agnew plans to enter Massachusetts Institute of Technology to study aerospace engineering.

William C. Ellet III, son of Dr. William C. Ellet Jr., Northrop Corporate director of Market Research and Analysis. After graduation from Palos Verdes High School, Mr. Ellet hopes to enter the University of Chicago and study

liberal arts.

Jerry Gechter, son of Bernard J. Gechter, a Northrop Norair mathematician. Mr. Gechter expects to enroll at Harvard to major in physics upon graduation from Palisades High School.

Roger L. Hudson, son of Leslie E. Hudson, Northrop Ventura director of Contract Accounting. Now attending Cleveland High School, Mr. Hudson expects to enter UCLA to study law.

Marlene Price, daughter of Richard Price of Page Communications Engineers, Inc., Electronics group. Now attending Punahou School, Honolulu, Miss Price hopes to enter Sarah Lawrence to major in languages.

Loftin E. Elvey Jr., son of Loftin E. Elvey, manager of Information Systems and Data Processing at Nortronics' Precision Products department. After finishing Norwood senior high school, Mr. Elvey expects to study mathematics at Harvard.

James B. Chapman, son of E. Blair Chapman, Northrop Ventura shop foreman. Columbia for a major in political

science is Mr. Chapman's aim following graduation from James Monroe High School.

Susan J. Rothstein, daughter of Dr. Lewis R. Rothstein, manager of Munitions and Chemical Manufacturing Operations at Northrop Carolina. Miss Rothstein hopes to matriculate at Duke University to major in English after completing high school at Lee H. Edwards High School.

In winning 1966 Merit Scholarships, the Northrop youngsters join a select group of 2250 other winners across the nation who were selected by the National Merit Scholarship Corporation from a field of more than 14,000 finalists.

Northrop scholars began their quest for their current status by taking qualifying examinations in their junior year in high school, then college aptitude tests in their senior year. Skilled evaluators drawn largely from college admission fields conducted judging. Considered were such factors as grades, accomplishments outside the classroom,

extracurricular activities and school recommendations as well as test scores.

Northrop began participating in the National Merit Scholarship program in 1959.

Currently, 12 Northrop sons and daughters are enrolled in college studying under Northrop Merit Scholarships. They are Donna L. Daley, Barry K. Rosen, Seth R. Alpert, Robert D. Campbell, Lance Bertelsen, Douglas A. Cook, Alice L. Cordell, Robert W. Dedon, Paul M. Glassco, Nicholas D. Humez, Robert P. McMahon and Gary J. Turnbull.

In addition to individual grants to winning scholars, Northrop makes an additional outright educational grant to the college selected by Northrop Merit Scholars.

National Merit Scholarships are a part of an extensive Aid to Higher Education program followed by Northrop Corporation. It also includes restricted and unrestricted grants to various colleges and universities across the United States.

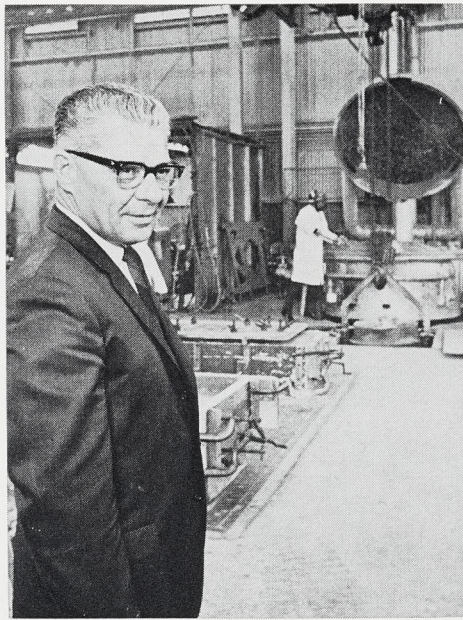




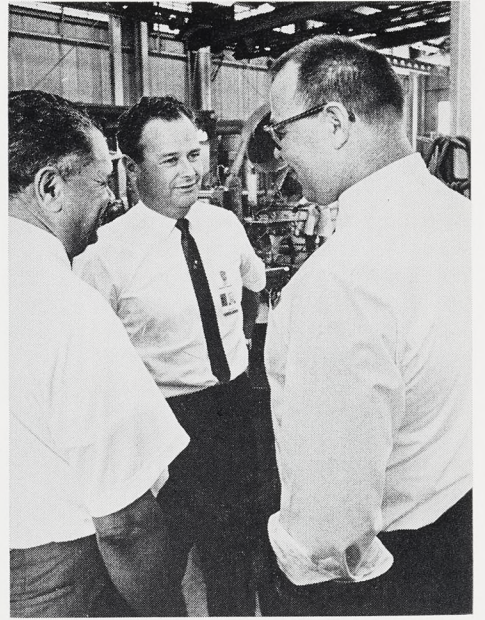
This humble beginning is basis for forming aircraft parts. Contour shaping of dies, as performed by Mel Sechrist, is one of the jobs in the Foundry which require a "feel" for task.



Sand is used by Foundry shop as base for hot metal while it's hardening. "Sand gets better care than most people's lawns," as Ed DeBennett (above) can tell you.



Russ Smith, superintendent of Tool Design and Fabrication branch, of which Foundry shop is a part, drops by for a visit. He reports to Lou Morgan, chief of Tool Engineering.



Duke Ozenne, Foundry shop foreman; Bert Osterberg of Tool Engineering Services; and Frank Rosenstiel, general foreman of Templates and Form Tools shop, discuss upcoming projects.

## BY MEN WHO KNOW HOW

# The Die Is Cast...Again and Again

It isn't known yet whether Ercel Oliver will develop some kind of complex, but it must be disturbing at times to have been the newest member of an organization for fourteen and a half years.

He's a mold maker in Northrop Norair's Foundry group, which must hold the company record for number of years service per pound. Seniority of the nine-man group averages nearly 20 years.

"We refer to the boys as the 'old masters,'" says Foreman Duke Ozenne, himself a 19-year veteran. "It's not the kind of job you can train people for. It requires a high degree of craftsmanship and a 'feel' for the job which comes only through long experience."

At the head of the seniority parade are Stan

Micek and Lester Cure, who started their Northrop careers in 1941. A year later Ernest Robinson and Melvin Sechrist came along. Hubert Hoppen with 18 years; Wilburn Wells with 17; Edward DeBennett with 16; and Lester Morr with 15, round out the group.

More amazing yet, all of the men but two have been in the Foundry shop the entire time. Of the two exceptions, Mr. DeBennett was out of the shop for only one and a half years, and Mr. Wells was out two years.

It comes as a surprise to a lot of people that Northrop even has a foundry.

(The NORTHROP NEWS can vouch for this, since its reporter asked directions from more than a dozen people without success, and finally stumbled upon it by accident).

Located at the extreme northwest corner of the Hawthorne complex, the Foundry shop is a different world from the streamlined assembly route of the F-5 and T-38 or the air conditioned offices of the Engineering and Science Center.

Huge cauldrons of molten metal, bubbling at temperatures of 1000 degrees Fahrenheit or more, belch a shot of steam as ladles hanging from an overhead crane dip into them.

Guiding the ladles by chains and pulleys, the men pour the liquid metal into forms, where the metal hardens into tools which eventually find their way to all corners of the plant.

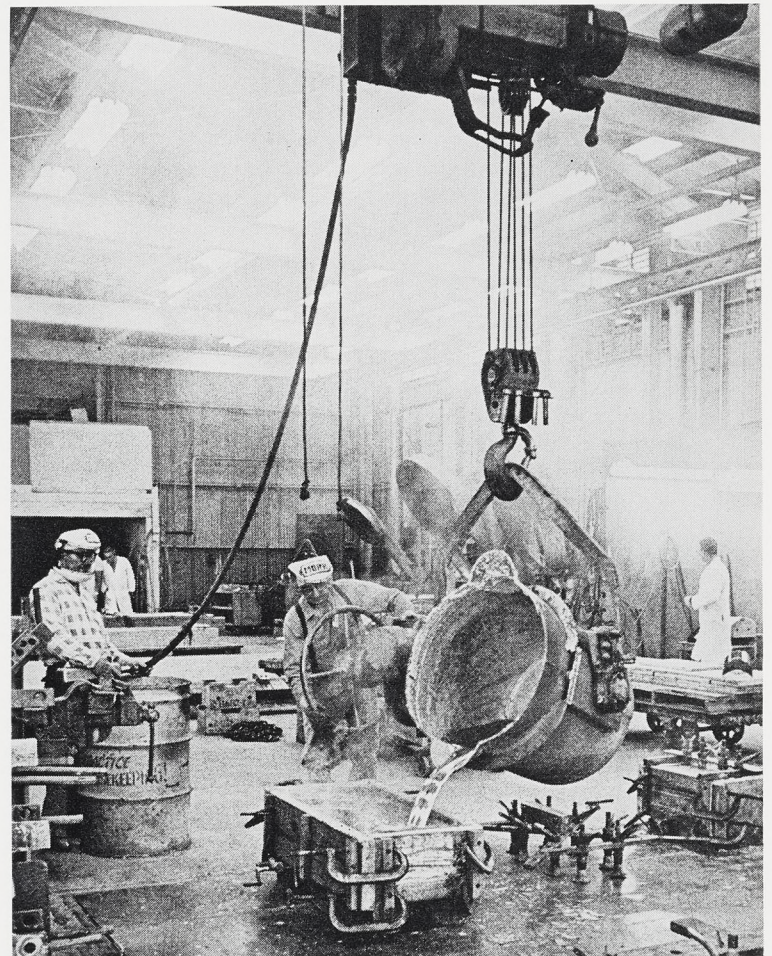
Foundry products range from lead hammers to a 10-ton slab of kirkcaldie recently formed for a research effort. Most frequently called for are drop hammer and stretch press dies used in forming contoured aircraft parts. These may weigh more than 30,000 pounds.

The Foundry pours more than 12,000 pounds of lead and 10,000 pounds of kirkcaldie in an average day. Today's total weight of lead

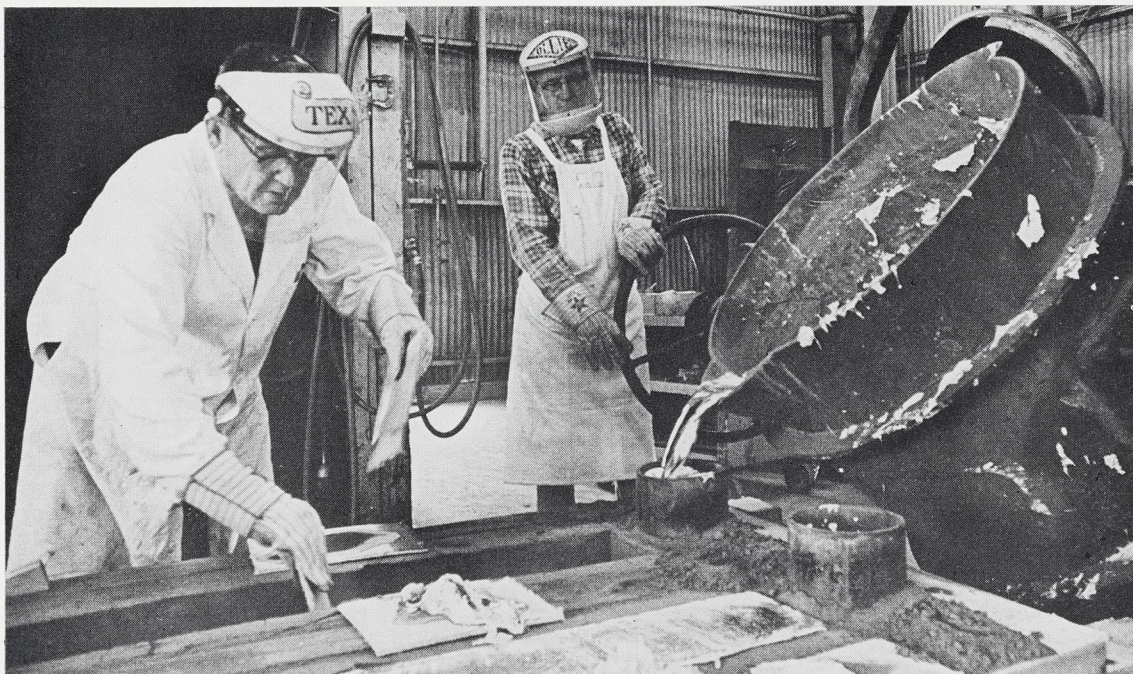
(See FOUNDRY, page 5)



Getting together for presentation of Tool Engineering's monthly Zero Defects award are Russ Smith, superintendent of Tool Design and Fabrication branch and members of the Foundry shop.



To make drop hammer die (above), Hubert Hoppen and Les Morr pour layer of lead which later will be mated with layer of kirkcaldie. Mel Sechrist (below) performs one of final chores before leaving metal to harden, that of "topping off." One of unique aspects of Foundry shop is that, with one exception, every job can be performed by any man in the shop.



With Ercel Oliver at the wheel and Tex Robinson scraping off slag metal, aluminum billets for advanced aircraft program are poured. Although metal may register up to

1400 degrees (for aluminum), there has never been an injury from hot metal in Foundry shop history.





## EAST AND WEST

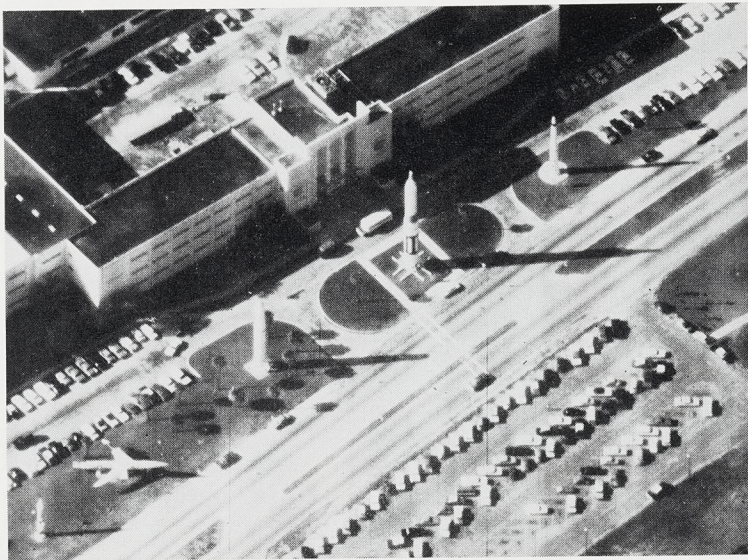
## ALOTS Performance Tops Specs

Flying actual missions intermixed with Air Force flights, Nortronics' Airborne Lightweight Optical Tracking System has proved it can do the job it was designed for: high-resolution long-range tracking and photography of missiles as they accelerate into space.

From about 40,000 feet altitude ALOTS tracked and photographed the recent Gemini 8 launch at the Air Force Eastern Test Range (AFETR) that led to the first space rendezvous and docking.

Without landing again at Patrick Air Force Base, Florida, AFETR headquarters, the Boeing NKC-135 modified by Lockheed bearing the optical portions of ALOTS in its external pod, turned westward across the continent to monitor an Air Force launch at Vandenberg Air Force Base, California.

Operating the ALOTS equipment during these and other successful missions were Don Eakin and Jaime Oaxaca, both on the



NOT FROM A TALL BUILDING—ALOTS photographed Technical Laboratory at Patrick Air Force Base from between 11 and 14 miles away at 41,000 feet altitude. Slant-range photo shows array of missiles before building (from left) Pershing, Snark, Thor, Titan and Minuteman. Black lines are scratches on negative.

development team for the optical tracking system.

The acceptance test procedure included seven flights. Six photographed a target plane bearing Air Force standards resolution charts.

At five-mile range clear photographs were obtained of black bars 1.8 inches wide on a white background painted on the target plane's tail surface.

Jack Gantz, ALOTS project engineer, couldn't be happier with the way the optical tracking system is operating.

"Performance has been excellent," he said. "Better than specifications."

"We've caused considerable interest on the part of people involved in intelligence and reconnaissance, and others who need the capability of seeing from the air with high resolution."

ALOTS acceptance by the Air Force came in the form of a teletype message from Chester W. Smith, contracting officer at Patrick Air Force Base.

"Resolution tests," the message said, "have been successfully completed and the results indicate the resolution capability of ALOTS exceeds the minimum technical requirements of contract specifications."

"Based on successful com-

pletion of tests the ALOTS system has been accepted . . ."

Designed to fly at about seven miles altitude, ALOTS operates above 75 percent of the earth's atmosphere, eliminating much of the atmospheric distortion observed in missile surveillance photography from the ground.

The optical system permits high-resolution photography of targets measuring 12 feet from a distance of 200 miles.

Flying at 42,000 feet near Patrick Air Force Base, ALOTS was able to take pictures of the ground that clearly showed a man leaving home for work, complete with well-defined early morning shadow. It took pictures of children playing ball, and in several frames the ball itself is clearly visible in its flight from one youngster to another.

All this was accomplished through the higher density atmosphere below the NKC-135, through which such fine performance is not normally expected.

For missile surveillance, taking pictures through the rarefied higher atmosphere, ALOTS will provide information on conditions during launch that have never before been clearly photographed.

Events during missile launch would be observable during important phases despite dense cloud cover at ground level.

## AIR UNIVERSITY NAMES HORNER TO VISITORS BOARD

Richard E. Horner, Northrop senior vice president and Norair general manager, was one of 13 nationally prominent men selected by the U. S. Air Force Air University to evaluate its educational program.

The educators, business executives and professional men form the Air University's Board of Visitors. This is Mr. Horner's second year on the board.

During a four-day meeting, board members conducted an intensive examination of the Air University at Maxwell Air Force Base, Montgomery, Alabama, its mission, organization, management and policies. The command's curriculum, methods of instruction, facilities and other aspects of operation were also studied.

The board's recommendations were submitted to Lt. General John W. Carpenter III, Air University commander, to assist him in carrying out the mission of the Air Force's professional educational center.

The meeting was the board's 22nd since it was established in 1946 by General Muir S. Fairchild, first commander of the Air University. The command celebrated its 20th anniversary earlier this month.

## Managers in Action Theme of New Series

Present and potential managers have been invited to see "Managers in Action," a series of 13 down-to-earth talks by Lawrence A. Appley, president of the American Management Association, at 10 p.m. each Monday on KCET-TV, Channel 28.

The presentation by Los Angeles educational television began this week and will continue through July 18.

The series is also recommended for "every man's wife who ever wondered 'what is management anyway' and for every man's son or daughter who expects to take a place in the world of business."



Adding a personal touch to the wondrous surroundings of Northrop Ventura's Newbury Park facility, Paradyamicist Theo Knacke installed this bird feeder outside his office window just in time for spring.

## Knacke Selected For AIAA Group On Deceleration

Paradyamicist Theo Knacke of Northrop Ventura will join 21 other experts on NASA and Air Force recovery systems on an American Institute of Aeronautics and Astronautics Aerodynamic Deceleration Systems committee.

The AIAA committee includes internationally known pioneers in the fields of parachutes, balloons, Ballutes (parachutes which fill with air as they descend) and paragliders.

Heading the group is Earl C. Myers, technical director of the Air Force 6511th Parachute Test Group at El Centro, California.

One of the committee's tasks will be presentation of a national symposium on aerodynamic deceleration on September 7 to 9 in Houston, Texas. The meeting will cover advanced thinking in the fields of space recovery, cargo delivery and allied technical subjects.

Mr. Knacke was responsible for some of the original research on supersonic parachutes as well as being co-inventor of ribbon parachutes.

## Breckenridge Named To Head Central Office

L. C. Breckenridge has been promoted to the position of Corporate manager of Northrop's Central Regional office at Dayton, Ohio, according to an announcement by Glenn R. Lord, Corporate vice president — Marketing.



Mr. Breckenridge

Mr. Breckenridge has been Norair Division director in the Central Regional office for the past seven years. In addition to his new assignment, Mr. Breckenridge will continue as Norair Division director in the Dayton office.

Mr. Breckenridge joined Northrop in 1945 after having served with distinction in World War II as a bomber pilot in the European theater. His decorations include the Distinguished Flying Cross and the Air Medal with six clusters.

## WITH A BUSINESS ORIENTATION

## Five Groups Reorganize At P.V. For Systems Approach

Planning techniques usually reserved for scientific research and development programs are currently being assessed as tools for use in business areas at Nortronics' Space and Information Systems section.

Mike Turney, director of the recently expanded section, reports that statistical analysis is being applied as a part of the section's planning efforts. Objectives are to scientifically assess program opportunities to assure selection of those which have high investment return probability.

The Space and Information Systems section was expanded late in 1965 to consolidate the efforts of hardware and systems oriented groups into an integrated effort towards specific business objectives. It includes the Systems Engineering, Command and Control, Information Systems, Weapons Status Reporting, and Tracking and Display Systems groups.

The consolidation of these groups permits the alignment and continuity of capabilities that are best concentrated towards the Data Acquisition, Intelli-

gence, and Command and Control needs of aerospace and defense programs.

"The systems approach so long recognized in the aerospace industry," Mr. Turney pointed out, "is becoming more encompassing of any company's efforts."

"The five individually oriented groups," he said, "will have decided advantages in coordinating the hardware needs of a total system now that they are together in the Space and Information Systems section."

Mr. Turney spoke of the phases of a military or space mission with which the groups in his section align themselves:

Data Acquisition, or obtaining information from various sensors as a prerequisite to a mission;

Intelligence, or the processing and interpretation of the information gathered;

Command and Control, the presentation of the information to decision making authorities.

"Working together," he said, "we can better define and produce the systems

hardware to meet the needs of these mission phases."

The use of statistical techniques as an aid in determining the section's goals begins with advanced analysis of customers' and potential customers' needs.

As early as three years in advance of the stage when proposals may be appropriate, Applications Engineers and Market Research personnel are contacting representatives of government agencies or firms that Nortronics does, or plans to do, business with. These contacts are maintained to keep abreast of customer requirements. They continually submit information rating competitors' capabilities and customers' funded positions for each potential program.

This marketing information is collected, statistically analyzed and inserted into a projected business plan where the probability of award, expectation dollars, and investment necessary to properly pursue these programs are derived.

"Through these data," Mr. Turney said, "we can determine our best bet acquisitions and concentrate our re-

sources in their pursuit. We align our R&D projects and technologies in support of markets we seek in order to enhance our capabilities of obtaining new business."

Chiefs of the five groups in the section are A. R. Vogel, Weapons Status Reporting; S. V. Edens, Information Systems; G. J. Friedman, Systems Engineering; Ross Chiles, Command and Control; and D. E. Conklin, Tracking and Display Systems.

Assigned by the Marketing department to this area of activity as Applications Engineers are Bob Miller, Gene Courtier, Bob Morgan, Bob Rodgers, Tim McCarty, Chuck Blaney and Gordon Wedell, with Vic Bray, and Homer Starnes as chiefs of Applications Engineering.

Roy Graboff, Hirsch Evans, Norm Bolduc, Bill Miller, and John Roehrig of the Technical and Operations Project Analysis and Reports groups represent the Finance and Administration and Control sections in establishing and maintaining the business systems in this section.



Classified

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private business are not accepted. The Northrop News reserves the right to edit or omit ads. Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale

VW Conv., 1961, new paint, tires, excel. mechanical condition, \$950. Studio City. PO 3-1024.

Panel Truck, 1955 Chevrolet, \$200. Lawndale, 370-3365.

Camera, Polaroid, model 95B w/flash attachment, take color or black & white, \$35. Torrance, 835-2367.

Pups, poodles, AKC reg., silver, small min., 1 male, 1 female, born Feb. 8, \$100 ea. Fullerton, 871-4592.

MGB, 1965, removable h/top, r/h, \$2550. La Habra, 691-9534.

Apt. Bldg., 9 deluxe units, 3-bdrm. owner's unit with f/p, \$12,500 yearly gross, No. Inglewood area, \$105,000. Torrance, 325-9832.

Dog, boxer, fawn, female; white chest, blaze, & socks; cropped, docked & perm. shots; AKC reg., consider lease arrangement, \$150. Redondo Bch., 374-4676.

Pickup, 1955, 1/2 ton Chevrolet, GMC Hydro, completely restored, new 6-ply tires, \$650. Compton, 823-1945.

House, 3-bdrm., den, fireplace, lge. patio, complete landscape, block wall, on corner, near all schools & fwys., \$25,000. Garden Grove, 534-1748.

Volkswagen panel, 1958, \$300. Inglewood, 329-0764.

T-Bird, 1956, h/top, fresh o/haul, paint & tires, auto. trans., orig. owner, \$1275. Pac. Palisades, 454-2057.

Chalet, new, completely furn., sleeps 10, Lake Gregory area, San Bernardino Mtns., will take second, \$32,500. P.V., 377-2058.

Gas Heater, vented, panel ray, 5 1/2 ft. tall, \$25. Inglewood, 677-4292.

Slide Projector, 35mm Tower, remote control, \$40. Inglewood, 674-0755.

Bicycle, 10-spd. Derailleur, \$30. Long Bch., 422-8835.

Willys, 1953, Mercury rear end, early Ford front end, \$25. Long Bch., 434-7155.

Dishwasher, portable, GE deluxe, w/cherrywood top, \$195. Manhattan Bch., 374-0940.

House, 3-bdrm., family rm., 1 3/4 baths, bltins, uble. gar., 3 1/2 yrs. old, \$22,950. Lom-inguez Hills, 632-7702.

Military Jeep, 1942 Willys, \$435. Fullerton, LA 5-4839.

Stereo Hi-Fi Components, AM/FM tuner, dual amplifiers, dual preamps, dual crossovers, 4 speakers, stereo turntable, \$70. Hawthorne, 676-0418.

House, new, 3-bdrm. & den, 2 baths, bltin range, dishwasher, disp., thermo. heat control, \$2000 dn., Simi Valley, \$22,000. Redondo Bch., 378-3809.

Sprite, 1958, new top, paint, windows, tonneau, custom int., \$850. L.A., EX 7-5514.

Sailing Dinghy, 3/8" plywood w/cotton sail, \$85. San Pedro, TE 1-9545.

Pickup, Ford Ranchero, 1963, air cond., new General Tires, tonneau cover, orig. owner, \$1150. Redondo Bch., FR 4-7139.

Tape Recorder, voice & music, 2-track, 2-spd. stereo playback, \$40. Manhattan Bch., 379-6762.

Barbell Set, \$10. L.A., 672-8972.

Organ, Thomas electronic, single manual, bass pedals, tone controls, bench & music avail., \$125. Torrance, 323-4209.

Tent, 9x12 umbrella w/side room, green, dry wall construction, \$30. Thousand Oaks, 679-5521.

House, 4-bdrm., family rm., 2 1/2 baths, 1-acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186.

Glass Sloop, 15', \$550. Torrance, DA 6-6497.

Porsche conv. D, 1959, Michelin X tires, radio, new paint, \$1650. P.V. Pen., 377-4268.

Organ, Conn Minuet, w/bltin Leslie speaker, fruitwood finish, lamp incl., 1964 model, \$1195. Manhattan Bch., FR 4-6215.

Bicycles, boy's & girl's 26", \$5 ea. Lawndale, OS 9-0876.

Trailer, 1961 Globe, sleeps 4, stove & refrg., 13 1/2', \$525. Hawthorne, 671-8413, OR 3-0995.

Ford, 1956, 2-dr., p/s, r/h, good tires & eng., \$225. Hawthorne, OS 6-5219.

Mercury, 1956, custom 2-dr. h/top, r/h, auto. trans., new Delco battery, o/load springs, 42,000 miles since eng. rebilt., 1-owner, \$150. Hawthorne, OS 9-6334.

VW, 1966, Sunroof 1300, s/belts, low miles, \$1750. P.V. Pen., 326-4589.

Chevrolet Bel Aire, 1955 2-dr. sedan, V-8, std. trans., \$375. Inglewood, 672-5834.

Pontiac Catalina, 1960 convt., new top, p/s, r/h, w/s/w, \$855. Inglewood, 673-1589.

Tape Player, cartridge-type, Bell model 404, w/14-watt stereo amplifier, incl. channel tone controls, \$65. Norwalk, 865-6736.

Pups, min. schnauzer, AKC papers, \$100. San Pedro, 832-3755.

For Sale

Organ, Conn electronic, blonde, \$500. Torrance, FR 8-1350.

Ford station wagon, 1958, rebilt. eng., new paint, new tires, \$400. L.A., 775-7827.

Camp Trailer, 14' Scotsman, sleeps 6, 3-burner butane stove, 3-way lights, ice box, \$750. Garden Grove, 714-539-0670.

Trailer, 1957 Universal, 8'x40', 2-bdrm., completely furn., newly carpeted, bath, living rm., kitchen, dinette, small dn., bal. monthly, \$2500. Manhattan Bch., 676-7387.

Chevrolet, 1957 2-dr., \$275. Long Bch., GA 2-5152.

Plymouth Plaza, 1957 2-dr. sedan, 6-cyl., std. trans., 45,000 miles, good tires & uph., radio w/rear spkr., heater, s/belts, \$225. L.A., 752-7614.

Corvair Monza, 1962, sport coupe, stick, 4-spd., \$935. L.A., 670-4342.

Camper, 8' Alaskan, gas refrig., stove & extras, & 1959 Dodge truck, V-8, p/s, p/b, auto. trans., r/h, air, \$2100. Canoga Pk., DI 0-7752.

Guitar, Fender Duosonic, w/case & cord., cost \$165, \$105. Wilmington, 834-4184.

Washer, RCA Whirlpool 2-spd., 3 temp. settings, new pump, \$70. Compton, 635-9082.

Opel station wagon, 1960, \$200. Huntington Bch., 847-0956.

Impala Sport Coupe, 1963, air cond., p/s, auto., 29,500 miles, \$1600. Hawthorne, 894-2426.

Tool Box & Tools, 24" Gerstner, \$160. Gardena, DA 4-8853.

House, 3-bdrm., 1 1/2 bath, bltins, dble. gar., 1 mile from ocean, \$500 dn., \$20,000. Redondo Bch., 374-2433.

Own-Your-Own Apt., 1-bdrm., 900 sq. ft., deluxe, bltins, pool, close to stores & transp., \$16,950. Inglewood, 674-7743.

Metro, 1959 h/top, deck lid, new tires, \$350. Gardena, 327-3895.

Chevrolet, 1959 Parkwood station wagon, r/h, Powerglide, V-8, \$450. P.V. Ests., FR 5-0867.

Chevrolet, 1956, 4 new tires, needs ring & valve job, \$225. Hawthorne, 675-8367.

Pontiac Bonneville, 1961, convt., p/s, p/b, p/windows, deluxe Wonder Bar radio, new top, 29,000 miles, \$1200. Hawthorne, 644-1785.

Ski Boots, women's medium, \$10. Box 801.

Home, 3-bdrm., fam. rm., 2 baths, all elec. kit., FA heating, flagstone covered patio, 2-car det. gar., lge. fenced yd., 7 mins. to Nortronics Anaheim, 4 1/2% GI loan or refinancing avail., \$22,650. Orange, 633-4378.

Eico, model 221 VTVM less probes, \$15. Torrance, DA 6-8273.

Range, Western Holly, 2 ovens, 4 top burners & top grill, \$80. Hermosa Bch., FR 9-7342.

Falcon, 1963, deluxe wagon, under seal Fordomatic, 6-cyl. rack, \$1275. Redondo Bch., FR 8-2609.

Renault Parts, miscellaneous, \$30. DA 6-5558.

Stereo Hi-Fi, Packard Bell, auto. 4-spd. record player, AM-FM tuner, 2 ea. speakers, 15" Woofer, oval mid range & horn tweeter, 120 watts amp., maple cabinet & matching enc., cost \$625; \$195. Redondo Bch., FR 6-6415.

Utility Trailer, 2-wheel, 5'x9' bed, spare wheel & tire, \$75. Canoga Pk., 346-5958.

Vacation Trailer, 15', 1956, spare tire, bumper, sleeps 5, extras, \$640. Hawthorne, 679-7497.

Refrigerator Frigidaire, small, freezer, \$25. Inglewood, OR 4-7301.

Range, elec., Westinghouse, coppertone, auto. controls, 1 1/2 yrs. old, 4-burner, \$100. Gardena, 324-0274.

Wedding & Engagement Ring, diamond, white gold, cost \$700, \$350. Hawthorne, 679-2456.

Surfboard, 9' 1", 1 stringer, clear, no open dings, \$55. Redondo Bch., FR 5-0061.

Pickup, 1959 Chevrolet, 1/2-ton, Hydro., r/h, low mileage, \$675. Hawthorne, 676-1018.

Ford, 1901 1/2-scale model, holds 1 adult or 2 children, buggy top, wire wheels, \$45. Anaheim, 774-2779.

Rambler, 1963, 4-dr. Classic, air cond., r/h, new tires, std. 6-cyl., \$1099. Buena Pk., 714-521-0416.

Bar-B-Que, Big Boy, 21" dia. w/motor brazier, used twice, \$5. Hawthorne, 676-0758.

Ford, 1940 deluxe, coupe, 1955 Buick eng., new black paint, \$350. Torrance, 371-8564.

Motorcycle, 1954 Zundapp, new rings & valves, near new trans., \$100. Manhattan Bch., 374-7318.

Motorcycle, 3-wheel, lightweight, 2-spd. trans., clutch & brakes, \$65. Redondo Bch., FR 5-0747.

Corvair Monza, 1965, stick shift, r/h, w/w, s/belts, 13,000 miles, \$1700. Compton, 635-2648.

Chevrolet, 1956 sedan, new tires & battery, \$140. Cypress, 673-1543.

Television, 19" Muntz, new picture tube, 11 mos. guarantee, o/hailed, \$25. Inglewood, 678-1350.

Tempest, 1963 station wagon, 4 cyl., 4-spd. manual trans., tachometer, b/seats, fact. air cond., Michelin tires, orig. owner, \$1400. Hollywood Riviera, FR 8-7577.

Pups, 6 wks. old, wire haired & terrier mix, \$2.50. Lawndale, FR 0-9440.

Table Saw, 10", tilting arbor, 1 hp motor, \$130. Redondo Bch., OS 6-2491.

Bed, queen size, foam mattress, \$40. Eastview, TE 2-1684.

For Sale

Poodle, black, 4 mos. old, std., female, AKC reg., \$70. Gardena, 324-3760.

Divan & 2 color coord. easy chairs, used 9 mos., \$600 value, \$250. Torrance DA 7-2851.

Organ, elec., walnut, 6 voices, vibrato, pedal bass, \$135. Culver City, VE 9-5438.

Sheepdog, shetland, tri-color, female, AKC reg., 7 mos. old, \$45. Inglewood, OR 1-0046, OR 4-9481.

House, 2-bdrm. & den, 50x150 lot, fenced, \$17,500. Redondo Bch., 376-1610.

Chevrolet, 1958 Impala, p/b, p/s, Turbo-glide, r/h, 345 cu. in. V-8 eng., \$400. P.V. Pen., FR 7-4668.

Stereo Console, Magnavox, 2-unit, ebony & gold finish, \$150. Garden Grove, 530-1734.

Bed, twin, head & foot boards, Baumritter maple, \$25. Santa Ana, 714-839-1797.

Crutches & metal walk aid, \$18. Canoga Pk., 348-8588.

Ping Pong Table, plywood, 5' x 9' x 5/8 thickness, \$10. Lawndale, OS 9-0876.

Corvair Monza, 1962, coupe, 4-spd., r/h, large eng., new brakes & shocks, 4 new Michelin X tires, many extras, \$1000. Huntington Bch., 714-847-2648.

Plymouth, 1956, radio, auto. trans., stabilizers, w/w tires, \$195. Hawthorne, 644-1958.

Bar, custom-made beer bar, 3' by 3' by 4'6", \$180. Hawthorne, 679-8009.

Radial Saw, Delta Rockwell, hvy. duty, 10" model, 1 1/2 hp dual voltage motor, lncs. stand & extra blade, cost \$400, \$225. P.V. Pen., 377-6434.

Impala, 1964, 4-dr. h/top, 327 eng., factory air, auto, p/s, new tires, \$2395. Gardena, 327-2279.

Dodge, 1963, 330 2-dr. sedan, full fact. race equip., never raced, \$1400. Box 802.

Chevrolet, 1957, 2-dr., auto. trans., r/h, recently painted, \$225. Torrance, 835-5708.

Studio Couch, Simmons, brown & white striped, new, \$40. Hawthorne, OS 9-6449.

Vacuum Cleaner, Hoover upright deluxe model w/attachs., \$55. Fullerton, 714-529-4788.

T-Bird, 1962, r/h, all power, good tires, \$1200. Inglewood, 677-0743.

Surfboard, foam, 7' 6", blue, \$25. Manhattan Bch., FR 9-7490.

Impala sport coupe, 1958, 348 cu. in. w/ Turbo-glide, chrome wheels & many extras, \$975. Lynwood, 632-2642.

Alfa Romeo Spider, 1964, Perelli's in good cond., disc brakes & 5 forward, \$2895. Lynwood, 635-3784.

Wanted to Buy

Battery Chargers, 24 volt, 3 to 5 amp. & 12 volt, 10 to 20 amp. Whittier, OX 3-4117.

Coffee Table, walnut, & vacuum cleaner, Kirby. Wilmington, 835-9070.

Pool Table, 8', slate top, any condition. Redondo Bch., FR 2-8254.

Dishwasher, portable. Inglewood, OR 1-8106.

Set of children's right-hand golf clubs, & bag. Pico Rivera, OX 5-1445.

FRINGE BENEFITS

(Continued from page 2)

know, there used to be a standard deduction of 14 percent, but beginning May 1 there will be six different withholding rates scaled upward from 14 to 30 percent. Unless the Government changes its mind, we won't be paying any more income taxes for the year but we will be paying them faster. This may not be a bad idea since we shouldn't have to dig down in our pockets so much next April, but we will have less money as we go along.

Then we have our fine Salaried and Hourly Savings Plans under which the company puts up 50 cents for each dollar we deposit. It is almost impossible not to take advantage of this kind of investment and most of us are in one plan or the other. All of this doesn't seem to leave much room for buying savings bonds. The fact remains, however, that 78 percent of our people are putting by something, perhaps as little as 50 cents a week, to buy a United States bond. The interest rate gets better each year.

One of the most gratifying things about the whole plan is that we do not have to pay income tax on any of the interest which is accumulating on Series E Bonds until we turn them in. All in all, these bonds look pretty good after a few years if we buy by paying a little at a time. We are now being requested by our Government to step up our participation. I hope that most of us can spare that extra little bit for a bond deduction.

I don't want to get away without thanking the many nice people who have written me about these articles and about the things which our benefits have done for them. One letter came to me this morning from one of our people who had had an extended illness. She said, in part:

"Your articles in the Northrop News have been very helpful in understanding the various fringe benefits offered by your plan. As one

FREE (To Be Given Away)

Pups, 6, Collie & Weimaraner, assorted colors. Hawthorne, 675-8262.

Kittens, half manx, red or red & white, 1 female, 3 males, 4 wks. old. Box 803.

Rentals Offered

Apt, deluxe, 1-bdrm., bltins, pool, \$95 mo. Redondo Bch., 376-2117.

Apt, 3-bdrm., unfurn., deluxe, bltins, 1 1/2 bath, pvt. patio & gar., children OK, near Northrop, \$140. Hawthorne, OS 5-7938.

Housekeeping Cabins, stream, patios, \$20 to \$30 weekend, \$50 to \$70 wk. L.A., PL 4-5288.

Vacation Cabins, Lake Gregory & Crestline, make reservations early for May thru Sept., \$25 weekends, \$60 wk. Venice, EX 1-2040.

Apt, deluxe 2-bdrm., furn., lge. pool & patio, bltins, closed gar., near El Camino, \$135. Torrance, DA 9-5986.

House, 2-bdrm, stucco, h/wood floors, tile kitchen & bath, near Northrop Hawthorne, \$105 mo. Lawndale, 644-2002.

Apt., 1-bdrm., furn., bltins, pvt. deck, lge. pool, sub. parking, near Northrop, \$137.50 mo. Lawndale, 670-6084, 679-2117.

Apt., 1-bdrm., unfurn., bltins, disp., water & trash pd., laundry facilities, children OK, \$89.50. Hawthorne, 675-8388.

Apt, 2-bdrm, bltins, 15 mins. from Northrop, \$125 mo. Torrance, 325-9832.

Apt., lge. 1-bdrm., natural wood cabinets, carport, laundry rm., walk to Norair, \$95. Hawthorne, 675-2075.

Bachelor Apt., furn., utilities, 2 blocks so. of Northrop, \$85 mo. w/lease. Hawthorne, 676-1287.

Apt., 1-bdrm., downstairs, partly furn., stove & refrig., near Northrop, adults only, washer & dryer facilities, carport, \$90 mo. Hawthorne, OS 6-8283.

Apt., 1-bdrm., lge., 35' living rm. w/fireplace, open beam ceiling, furn. in maple, washer, utilities incld., 1 or 2 adults, close to Northrop, \$130 mo. Lawndale, OS 6-5425.

Cabin, Green Valley Lake, \$35 weekend, \$60 wk. Torrance, 320-2002.

Bachelor Apt, furn., near beach, \$65 mo. Torrance, 376-4496.

Apt, 1-bdrm., ext. lge., bltins, gar., close to Northrop, \$90. Harbor City, 325-5705.

Apt, 3-bdrm., furn., lge. rooms & closets, picture window, patio, 4 short blocks to Northrop Hawthorne, \$155 mo., inclds. utilities. San Pedro, TE 3-2512.

Apt, 1-bdrm., furn. & unfurn. fireplace, 1/2 block to ocean, closed gar., adults, from \$115. Redondo Bch., FR 8-7905.

Personals

Sewing Instructions needed to assist in completion of dress & jacket, approx. 3 hrs. work, will pay. Inglewood, 674-1730.

Alterations of all kinds especially men's clothes. L.A., PL 4-9866.

Will pick up new car in Europe this summer for anyone who wants one. Hawthorne, 679-5530.

Personals

A heartfelt thank you to all Norair & Nortronics personnel for their generosity & sympathy during our recent time of sorrow. WAYNE & SHERI OUELLETTE.

I wish to express my deep appreciation to our many friends at Norair & Nortronics for their many kindnesses during Roland's recent illness & passing. KATHRYN GLINES

For Sale or Trade

Buick, 1953, 2-dr. Super w/radio, good tires, runs good, \$150 or trade for electronic test equip't or photographic equip't. Hawthorne, OS 5-3866.

Lincoln Zephyr, 1937, classic, 4-dr., runs good, \$350, or trade for motorcycle. Lawndale, DA 9-6235.

Going my way?

Rides Wanted

7 a.m. — 3:45 p.m.

Oak & Manchester, Inglewood. Raphael Mederos, Norair, ext. 1714.

Yukon & 170th St., Torrance. Louie Quijano, Norair, ext. 2550, 2622, 329-8621.

8 a.m. — 4:45 p.m.

Figueroa & Anaheim, Wilmington. Tom Henrich, Norair, ext. 2425, 835-9070.

South St. & State College Blvd., Anaheim. Robert A. Buhbe, Norair, ext. 1465; 1466, 714 - 776-3939

Rides Offered

8 a.m. — 4:45 p.m.

South St. & State College Blvd., Anaheim. Robert A. Buhbe, Norair, ext. 1465; 1466, 714 - 776-3939.



## Bridge Club Offers Master Points to Regular Players

Northrop Bridge Club has something new to offer to regular competitors—master points.

The Club, sponsored by NRC at Anaheim, recently completed sanctioning arrangements with the American Contract Bridge League. Which means that master points, recognized by bridge players around the world, may be awarded in lieu of regular prizes.

Jack Kirkeby, NRC commissioner, indicates monthly events will be staged in which fractional points will be awarded. Six times each year special events will award full points.

The Club's first full master point night comes off tomorrow (April 28) at the NRC Clubhouse, Fullerton, with play beginning at 7:30.

## Auxiliary Planning Acquaintance Dance

Plans for an "Acquaintance Dance" May 15 at the NRC Clubhouse, Hawthorne, have been announced by the NRC Auxiliary.

Walt's Melodaires will play for dancing from 9 p.m. until 1 a.m. The price is \$2.65 per couple and includes all liquid and fun ingredients. There will also be a bonus opportunity for two free trips to Las Vegas for two couples.

Tickets are available through NRC outlets in the Hawthorne area.

## CAROLINA

(Continued from page 1)

The Asheville firm, which was acquired by Northrop last October, also is the developer of the first combustible rocket motor. This motor consumes itself after shutdown, thereby eliminating any danger from launchings over populated areas.

Most rockets today are launched away from populated areas because of the potential hazards to persons and property.

In recent tests, however, Northrop Carolina static tested four rocket motors which, in a matter of seconds following shutdown, were burned to a light friable ash ranging from zero to eight percent of the original case weight.



SOME NOW, SOME LATER—Group above at Nortronics Hawthorne are indicative of employees who have helped in recruiting drive by referring potential engineering personnel. Some have received Referral Award checks, others may get them later. George Richards (left), supervisor of

Personnel Administration, shows Referral Award Plan checks to Dick Keppel, Anthony Katchever, Phil Fox, Larry Beuder, Dick Lyle, Chris Polton, Leon Bledjean, Larry Stevenson, Hal Stevenson, Ellsworth Waits and Robert Smith.

## Nortronics Briefs Air Force Officers In AFEWI Program

Air Force Captains John W. Cannon and Gene C. Sue spent two weeks at Nortronics California facilities earlier this month, carrying out a part of their training program.

The officers, assigned to Northrop Corporation by the Air Force Institute of Technology's Education with Industry program, are engaged in a special course in Industrial Planning and Procurement. They reported to Northrop in September and will wind up their course in late June.

During their two-week assignment at Nortronics, Captains Sue and Cannon spent time with top executives at Palos Verdes, Hawthorne and Anaheim facilities. They were given a broad indoctrination into each major function and organization as a part of their specialized course.

R. W. Gregory and M. A. Severson served as training administrators for the Nortronics program.

## Hidden Recruiting Talent Discovered in 30 Referrals

Northrop Nortronics personnel are proving to be both apt and interested recruiters of engineering talent it appears this week.

More than 30 Employee Referral Award Plan forms, suggesting potential engineering applicants, have been received since the first of April when a major recruiting effort was intensified.

Nortronics currently has job openings for more than 150 qualified engineers to work on such new programs as the C-5A guidance system as well as tactical reconnaissance and intelligence systems.

To meet its requirements, Nortronics is conducting an extensive recruiting drive across the nation.

Employees are being asked to help by referring their acquaintances and friends who might like to join Northrop. In the process they may earn extra cash, since Northrop pays awards of \$100 or \$200, dependent upon classifications, to employees who refer an individual who subsequently accepts a job with Northrop.

"We have found the referral

system is one of the best methods of hiring," said Elmer Noonan, director of Industrial Relations. "We sincerely appreciate the interest and assistance of those who have made referrals and solicit the same help from others who have not."

Mr. Noonan pointed out that Nortronics employees are familiar with the openings we are trying to fill and the skill required to do the job. "Our employees can speak best for the many benefits and favorable working conditions found at Nortronics. Most important, we have the finest group of employees found anywhere and our people recommend individuals they want to work and associate with," he said.

Complete listings of current openings and required talents may be obtained from any Nortronics Personnel office.

Particular emphasis is currently being placed on hiring qualified engineers with such skills as digital computer design, navigational systems evaluation and analysis, reliability, computer programming, et cetera.

## Trivco Earns Area's Top Recognition

Trivco, Junior Achievement firm counseled by Nortronics Anaheim, has been selected greater Los Angeles' Junior Achievement Company-of-the-Year.

In winning this honor over 172 Junior Achievement firms in the area, Trivco also became the first Northrop-counseled firm to gain the area's highest recognition. Other firms have ranked in runner-up positions, but not first. Another firm counseled at Nortronics Anaheim was third runner-up two years ago.

Judging was under direction of the Los Angeles Junior Chamber of Commerce with a panel of business executives serving as judges. They questioned Trivco officers on the operation of their firm, the free enterprise system, and viewed company books and sales records.

Trivco will now be considered for Company-of-the-Year honors in the Western Region; the 11 western states and two Canadian provinces.

Advisors for Trivco, all from Nortronics Anaheim, are Cy Seeley, management; Leo Gross, production; Adie Weishaar, sales; and Ira Coleman, alternate. Bill Burch coordinates Junior Achievement activities for Nortronics.

Last month Trivco was selected as Orange County's Company-of-the-Year, earning a place in the Greater Los Angeles finals.

Next month the firm hopes to pay a substantial dividend to its 137 stockholders who will gather at the NRC Clubhouse, Fullerton, May 16 for final liquidation of the firm.

April 20 officers of Trivco were honored guests at a meeting of the Nortronics Management Club.

## COMPUTER

(Continued from page 1)

1051, the NDC-1050A, will also be exhibited. NDC-1050A is a lightweight, integrated circuit computer developed for the Air Force for a low cost inertial navigation system.

The technology which went into both the 1050A and 1051 is currently being extended as a major contribution to the Lockheed C-5A navigation system presently under development by Northrop Nortronics.

Significant achievements have also been reported by the Computer group in techniques and equipment required in support of the NDC-1051.

The test procedure and equipment employ unique methods which allow a significant reduction in unit test time.

In the software field, a symbolic assembly program and a macro assembly program have been developed, which will soon be supplemented by a Fortran-II compiler.

Unique to this type of computer is a roll table used to facilitate programming and software preparation.

The NDC-1051, which weighs only 28.6 pounds and occupies one-half a cubic foot of space, contains 785 integrated circuits and approximately 900 discrete components.

Its random access core memory has a basic capacity of 2048 words which can be expanded to 8192. Its calculated mean time between failure is 8500 hours.

## DESIGNER: Packaging for Beauty and Efficiency

(Continued from page 1)

able hardware to be used in their company products."

Mr. Schwartz was graduated from UCLA in 1959, where the industrial design major required a five-year curriculum with minors in engineering and business.

After a period with National Cash Register's Electronics Division, he spent eight months on tour, observing industrial design techniques around the world.

In Japan he visited the plants of Sony, Cannon Camera and Toshiba Electric, where he exchanged information regarding I.D. techniques in the United States with those of Japanese designers.

In Israel he met John Cheney, an American who was the director of the permanent I.D. exhibition of Israeli products in Haifa.

Copenhagen provided a wealth of good design in silverware, ceramics and furniture craftsmanship.

"Good esthetic design is easy," Mr. Schwartz contends. "It's ac-

tually a byproduct of good functional design. You just have to know what faults to look for."

As examples he listed: Parts of a product that look applied as an afterthought and are not integrated into the total product form.

Front panels that are not organized logically and esthetically.

Cables and wiring outside a piece of equipment which could be routed inside.

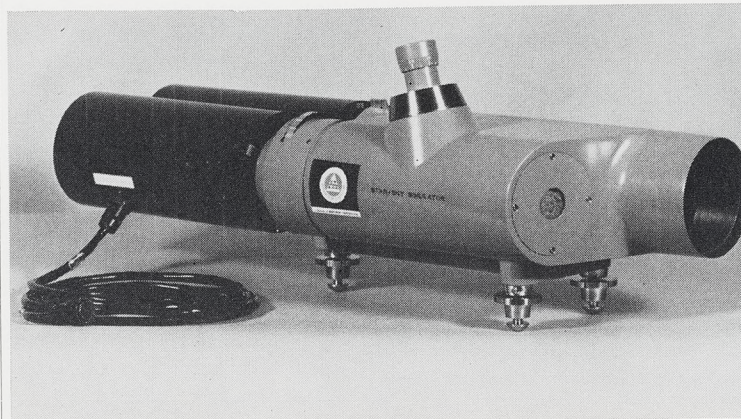
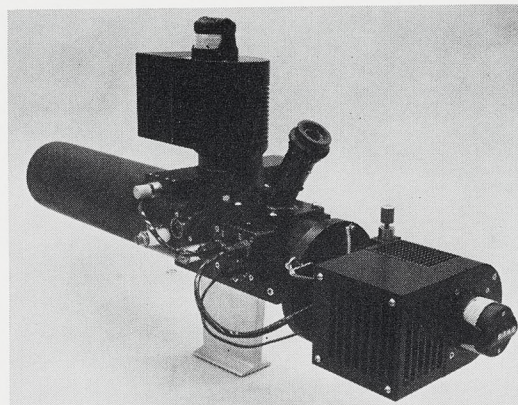
Dust-catching surfaces which could be made easier to clean by a smoother exterior shape.

Painted edges of access doors that become chipped from use and might have been protected by a more suitable finish.

"With each new product," he said, "new problems arise and new and imaginative solutions should be sought. When the first sketches and layouts are complete, the designer looks at them critically and tries to simplify.

Therein lies the secret of designing beautiful equipment—simplicity of concept and simplicity of form."

Star-sky simulator before (right) and after (below) application of industrial design techniques.





# NORTHROP NEWS

NORTHROP NORTRONICS

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Vol. 24, No. 9

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## Hourly Wage Increases Announced

Northrop paychecks issued June 10 to hourly-rated personnel at the Corporate office, Northrop and Nortronics west coast facilities will be noticeably fatter.

That's when a general wage increase, which is effective May 30, appears for the first time in wages. The maximum increase will be 10 cents per hour with individual amounts dependent upon labor grade classifications.

Also effective May 30, five cents of the existing 12-cent cost-of-living adjustment will be included in base rates. And the minima and maxima of hour rate ranges will be increased to reflect both the general increase and five-cent cost-of-living adjustment.

Fred Stevens, Northrop vice president and Nortronics general manager, indicated current wage adjustments at Nortronics are based on continuous studies in the field of wages and fringe benefit programs to insure that all forms of compensation for Northrop personnel compare favorably with those prevailing in the electronics industry. The wage changes just announced are in addition to a number of new and improved fringe benefit programs instituted over the past year.

"The long-standing Nortronics policy of providing total compensation programs for our personnel which compare favorably with the best in our industry will continue to provide balanced awards for all Nortronics people," Mr. Stevens said.

## Sculptor Has Work Exhibited by Bank

Free form sculpture created by Perry Bezanis, a Nortronics Hawthorne computer engineer, was among items displayed last week at the opening of a new Great Western Savings Bank office on Rosecrans just off Crenshaw.

The exhibit opened May 6 and is expected to run for two weeks.

Mr. Bezanis created his five sculpture pieces from stainless steel.



**GUIDING HAWK EFFORT**—Nortronics Anaheim is swinging back into production of Hawk missile system launchers and loaders to fill new order. Launcher forms fitting backdrop

of men slated to guide production, including new assembly line. They are (from left) Bob Russell, Nick Niccoli, Pete Falk, Grant Gunderson, Hugh Zebarth and Ed Paul.

## SALES, EARNINGS BOTH INCREASE FOR NINE MONTHS

Northrop earned \$6,904,000 on sales of \$244,000,000 in the first nine months of its fiscal year, Thomas V. Jones, Northrop president, reported Monday.

The nine-month earnings were equivalent to \$1.65 per share on the 4,179,343 shares outstanding.

In the first nine months of the previous year, Northrop earned \$6,136,000 on \$255,894,000 in sales, equivalent to \$1.50 per share on 4,097,939 shares then outstanding.

Third quarter earnings amounted to \$2,440,000, equivalent to 58 cents per share, with third quarter sales of \$88,845,000. This compares with third quarter earnings a year ago of \$2,116,000, equivalent to 52 cents per share with \$96,097,000 in sales.

The company's backlog at the end of the third quarter totaled \$435,000,000, as compared with

(See EARNINGS, page 6)

## Lindsey, Sumner Named To C-5 Program Staff

Dick Lindsey and Milt Sumner have been named deputy managers of the C-5 navigation system program, it was announced this week by Ross Miller, Northrop Nortronics vice president—Technical.

Lloyd Balsam was appointed program manager last month, when the contract for the system, valued in excess of \$20 million, was awarded Northrop by Lockheed-Georgia Company.

The program office, as well as functional organizations which will support the long term project, are now established in Nortronics' Hawthorne facility.

Mr. Lindsey will guide work involved in the airborne inertial navigation system and guidance system integration tasks, while Mr. Sumner will be responsible for such functions as aerospace ground equipment, FCE, and all software obligations.

The 700,000-pound C-5A,

which will enable the Air Force to deliver the heaviest of military equipment directly from the United States to any place in the world, is presently in development at Lockheed's Marietta, Georgia, plant.

Mr. Balsam joined Northrop in 1946 and has held key engineering management positions on such programs as the Snark, Skybolt and Nortronics-developed navigation systems. He holds a degree in liberal arts from Reed College, Oregon, and a BSEE degree from Massachusetts Institute of Technology.

After receiving a BSEE degree from the University of California at Berkeley, Mr. Lindsey joined Northrop in 1947. He has an extensive background in flight control work and was chief project engineer on the Skybolt. He also served as program manager for the Mark IV SINS system.

Mr. Sumner has served Nortronics as chief of Technical Support and chief of Reliability since 1960, working previous to this in a wide range of programs, including Special Weapons. He is a 1952 graduate (BSEE) of the California State Polytechnic College.

## Hawk Line Sees Familiar Faces Gather

Gathering of an experienced production crew to man a new assembly line continues at Nortronics Anaheim this week with progress of work to fill a new order for ground support equipment for the Hawk missile system.

Valued in excess of \$5 million, the order was placed by Raytheon Company.

Ultimately, units produced under the order will go to the government of Saudi Arabia to be used as part of that nation's new, modern air defense system.

For Nortronics Anaheim, a participator in the Hawk program continuously since 1954, it will mean a return to production of Northrop-designed launchers and loaders, plus an acceleration in production of elevons, missile wings and hydraulic actuators.

Nortronics designed and fabricated 243 Hawk loaders and 892 Hawk launchers for a program that got under way in the mid-1950's and phased out during 1963. Subsequently, modification work on Hawk loaders has been performed at Anaheim. Elevons, missile wings and hydraulic actuators have been in production at Anaheim without interruption since the mid-1950's.

Assembly operations on launchers and loaders will be carried out in Building Y-12.

A 100,000-square-foot facility previously used by Nortronics for warehousing and offices, Building Y-12 is currently being converted into a modern production facility. Already in operation there is assembly work on F-5 fighter and T-38 trainer aircraft components.

Other Hawk work is distributed throughout Anaheim manufacturing facilities — detailed part production, already in progress, in Building Y-1 and missile airframe work in Building Y-2.

Approximately 50 Nortronics employees have been assigned to various phases of Hawk work over the past months. As launchers and loaders move into assembly stages, this force will gradually build to around 75 employees and continue to build to

(See HAWK, page 6)

## AT NEEDHAM, MASSACHUSETTS

## Quayle Heads Redesignated Department

Northrop Nortronics Marine Equipment Department at Needham, Massachusetts, has been redesignated the Needham Department, and Thomas H. Quayle has



Mr. Quayle

been appointed a Division vice president and manager of the department.

In making the announcement Friday, Northrop vice president and Nortronics General Manager Fred Stevens said the change was in keeping with the expanded product base of the new department.

Mr. Quayle was one of the original 10 Northrop employees

when the company was formed in 1939. At that time he was a preliminary design engineer on the famed N3PB seaplane which Northrop built for Norway.

In his long and varied managerial career with Northrop, he has served as vice president and manager of Northrop's Anaheim facility, corporate vice president of Commercial and Industrial programs, and most recently, assistant to the Nortronics general manager.

Among the diversified products of Needham Department are automated ship control systems, helicopter armament systems, shipboard receivers which will be used in tests of the Navy's Omega navigation system, and five different subsystems for inertial

navigation systems on Apollo tracking ships.

Needham Department is a pioneer in the burgeoning technology of automated ship control systems and is designing and producing equipment for six Grace Line cargo ships.

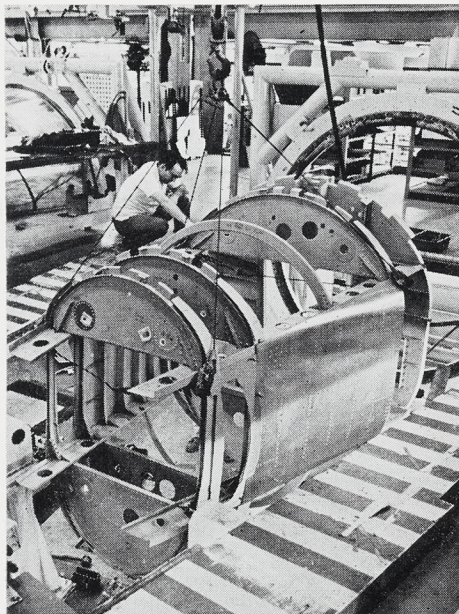
Helicopter armament systems are being produced for the Army's UH-1B helicopter and consists of two mounts, each supporting two machine guns.

Star tracking systems being produced for tracking ships to be used in the Apollo moon program include a new star sensor developed by Nortronics Palos Verdes and associated equipment produced by Needham under contract to Sperry Gyroscope Company.

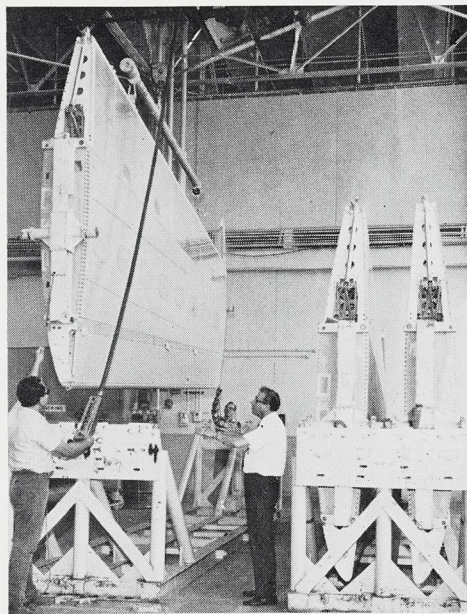


**FRONT LINE**—Milt Sumner, Lloyd Balsam and Dick Lindsey (left to right) head Nortronics C-5 navigation system program office.

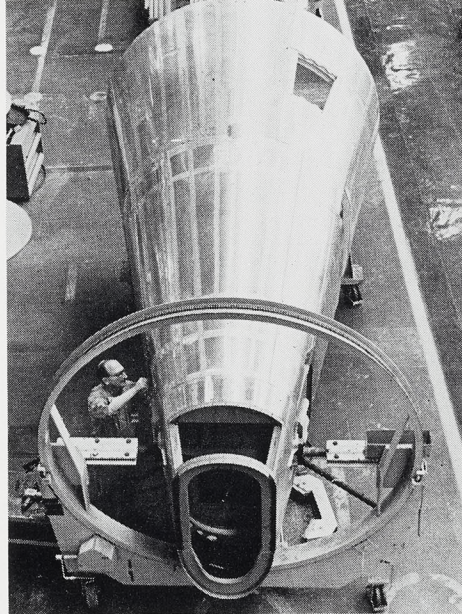




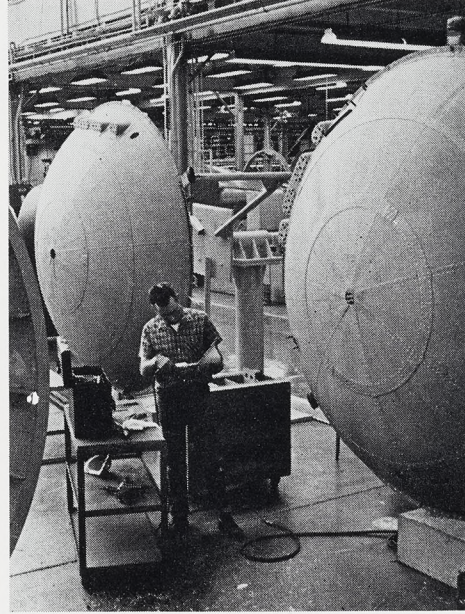
Main or "A jig" is among first assembly steps for Boeing 707 aft fuselage sections, here being loaded by Isaac Langley.



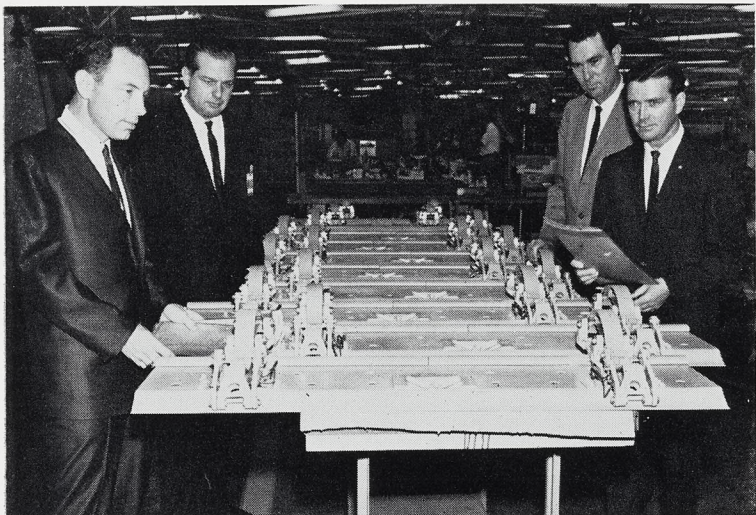
Foreman J. L. Warner (right) gives signal and another wing section is lowered into transportation fixture by Ralph Gonzales and James Black.



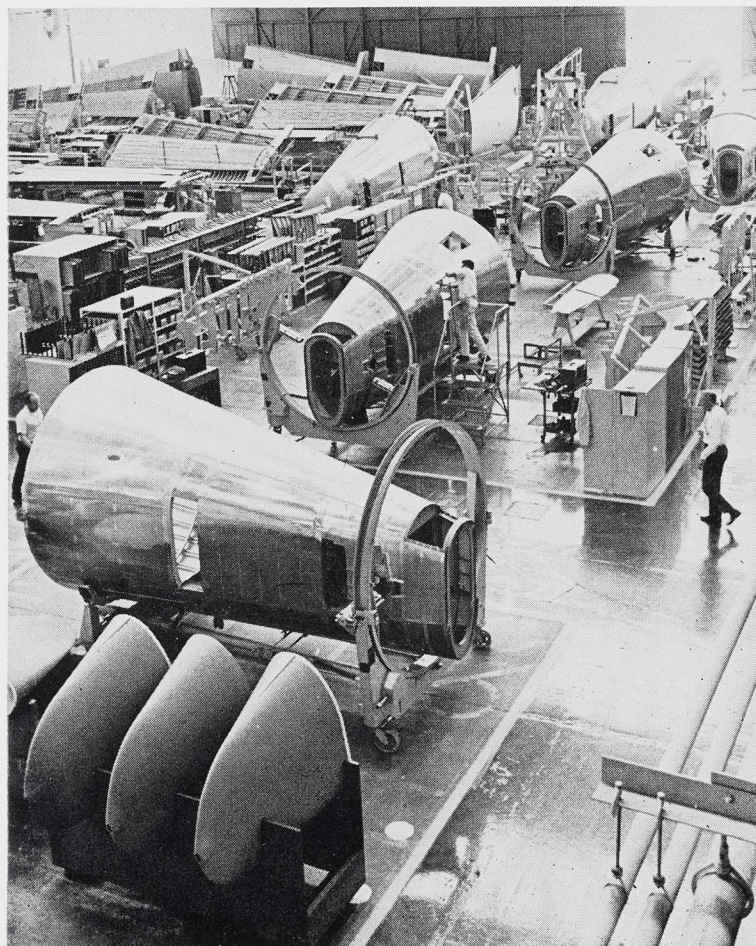
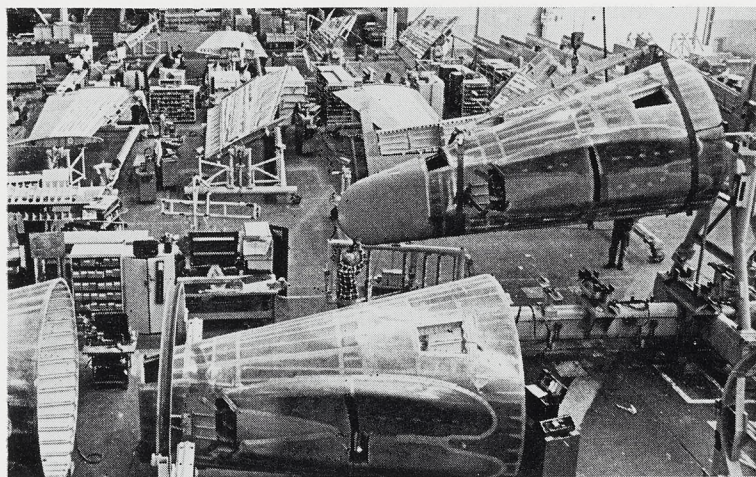
Rotating fixture enables John Tye to perform work on aft fuselage section from floor level. Section above is inverted.



Pressure bulkheads for aft fuselage form backdrop for Theo Hampton as they near completion on special assembly fixtures.



Boeing-Northrop working relationship, matured over a 10-year period, is best pictured in individuals. Boeing's Fred Walker and Jim Thomas (foreground) are resident Boeing representatives at Norair where they work closely on day-to-day basis with men like Bill Minner (left background) who heads Boeing program production effort and Ted Hallett who supervises some Quality Control efforts involved.



## THE BOEING LINE

# 125 Miles of Big Jet Structures

Imagine jet aircraft components laid end-to-end forming an unbroken line from Hawthorne to Bakersfield, a distance of over 125 miles. Unimpressed?

Then try this one: \$238 million or the equivalent of more than \$28,900 for each man and woman currently on Northrop Norair payroll.

Either illustration, or both, would be applicable in describing the scope and value of subcontract work Northrop Norair has performed for the Boeing Company in support of its large jet aircraft programs.

Initial phases of this work began more than 10 years ago. Current efforts are programmed to continue over at least the next three years. This work, of course, is in addition to the work Northrop Norair will perform on the giant Boeing 747.

This subcontract capability, an important adjunct to Norair's diversified operations, certainly holds some sort of "senior" status for its long duration. Products and projects have come and gone during the period, but this effort continues unabated.

It highlights a close and harmonious working relationship between Boeing and Northrop that spans more than two decades. During World War II, Northrop fabricated B-17 bomber components under subcontract to Boeing. This was followed by production of wing flaps for Boeing's B-50 bomber and the C-97 transport-tanker version of the same aircraft.

"We regard our efforts as an extension of Boeing's production capability," said Jack Manion, manager of Manufacturing and Materiel. "In attitude and in reaction we respond like Boeing management."

Northrop currently fabricates outer wing assemblies for right and left wings and aft fuselage sections for Boeing. This work has ranged through all military (called the KC-135) and

commercial (the famed 707) versions of Boeing's big jets.

Initial contracts were issued in 1955 calling for Norair to produce 29 ship sets of outer wings for the KC-135. Other contracts followed until Norair had produced 820 ship sets when the program phased out about a year ago.

From early 1957 through December 1964 Norair also fabricated 781 aft fuselage sections for the KC-135 program.

As Boeing moved into production of commercial 707's in various configurations, Northrop assumed responsibility for manufacture of both outer wing and aft fuselage components. From May 1956 through March 1966 more than 500 ship sets had been turned out.

Late last year a gradual acceleration in production rates began on this commercial program. From a rate of five and one-half ship sets per month, Norair is stepping up activities and by July will be turning out 10½ ship sets per month.

(By way of comparison, peak production of KC-135 components saw 20 ship sets per month fabricated.)

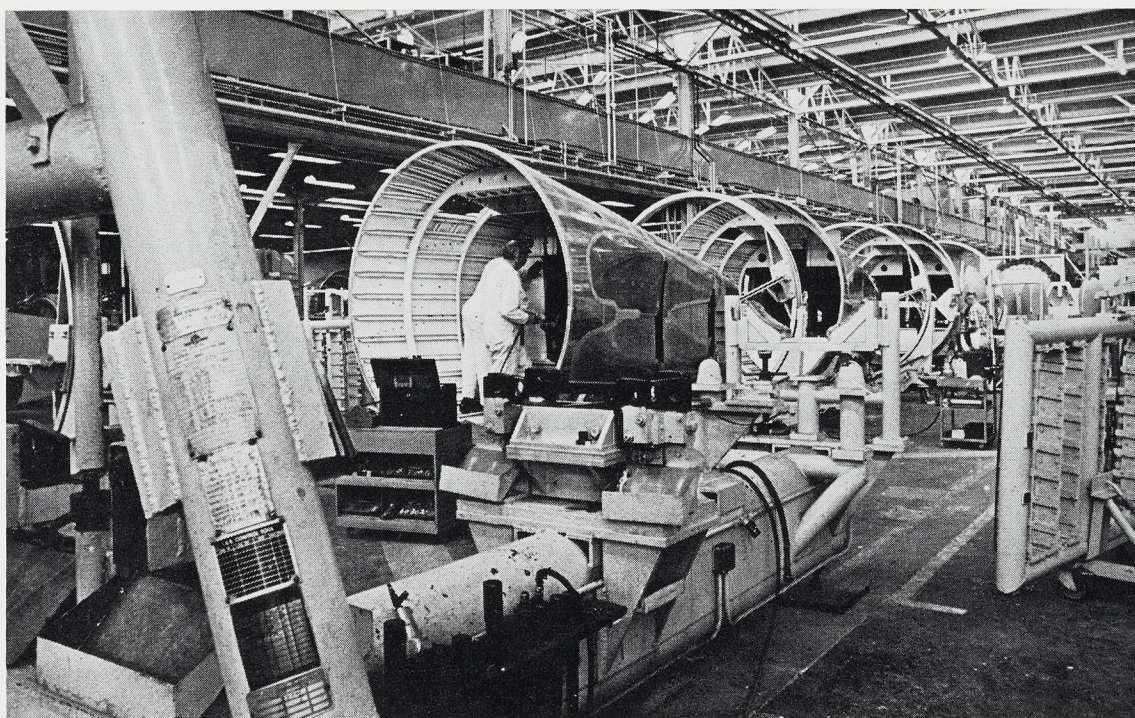
With its increased production, Norair is currently more deeply involved in fabricating commercial aircraft components for Boeing than ever before.

Another important contribution over the years has been in the production of spares for Boeing.

While enjoying an enviable reputation for on-schedule production in all phases of the program, Norair has also received many plaudits for its ability to meet emergencies involving spares.

For example, most employees recall a now-famous incident in which a commercial 707 lost a large section of outer wing as the result of a mid-air fire, yet landed safely. A hurried call for replacement components reached Nor-

(See BOEING LINE, page 5)



Final assembly area (left photos) shows aft fuselage sections and outer wings moving toward completion. Aft fuselage sections (above) move along line, each riding on

its own assembly fixture which serves as work station and also transportation device.



## OUR NIGHT AT DISNEYLAND

## Entertainment Bargain of Year

The family entertainment bargain of the year—unlimited use of the "magic kingdom" of Disneyland for a single price—is once again available to Northrop folk.

The date is May 27 and the occasion is Northrop Night at Disneyland.

Northrop Recreation Clubs at Norair, Ventura and Nortronics Divisions are pooling talents to make the event possible.

They have, as the date indicates, scheduled the night on the eve of the long Memorial Day holiday period. And it

means Disneyland will feature some added attractions as part of the usual holiday package.

For instance, among name bands and orchestras to be featured are those of Harry James and Xavier Cugat, plus Anita Day and a host of other surprise guest stars. They will be appearing at popular points within the magic funland.

But to the average family, a key point in NRC-sponsored night is the price—just \$3.95 per person with children under three admitted free. And the price opens the doors to any and all Disneyland attractions,

including the main gate. In short, once the original ticket is obtained everything else is free. There are no additional charges for rides, admissions, entertainment or anything, exclusive of shooting galleries. Northrop families can ride any attraction, see any show, or visit any feature again and again without further charge. It is a magic key to a magic kingdom.

To make this possible, the general public is cleared from Disneyland prior to 8 p.m. From that time until 2 a.m. the park is just for Northrop families and their guests.

Northrop Night at Disneyland is now a traditional affair heralding the arrival of summer. But since the last night there, many attractions have been added. For instance, there is, direct from the New York World's Fair, the feature "Great Moments with Mr. Lincoln." There are also added attractions for the very young. Only a personal visit can confirm what and where they are.

Northrop folk may obtain Disneyland tickets from all NRC ticket outlets.

## Al Pearson Wins Auto In Charity Drawing

For a man who heads a family of eight, Albert Pearson probably couldn't have won a more appropriate prize than a nine-passenger station wagon.

The Northrop Ventura branch engineer, assigned to the Engineering Laboratory, recently won a prize at the Mystical Rose Council spring festival, a fund raising campaign sponsored by the Knights of Pythias in Thousand Oaks.

Mr. Pearson's prize was won by a drawing.



Helen Pelke, Nortronics Hawthorne IBM operator, is being sponsored by Knights of Columbus as candidate for Hawthorne Fair in July. Pert Miss Pelke could win \$1500 prize, plus expense-paid trip for two to Europe, if she wins top honors. Votes are based on ticket sales.

## Solfeggietto, Computer Earn Honors for Youth

The age-old conflict between science and culture certainly isn't affecting 11-year-old Jimmy Celoni, whose Dad, Jim, works in Boundary Layer Research at Northrop Norair.

The Torrance lad was top winner recently in the Junior Division, South Bay Exchange Club's annual "Search for Talent" contest. A pianist, he performed *Solfeggietto* in C Minor and *Rondo a la Turque*.

For winning the talent contest, he earned the right to compete in the District finals at Redondo Beach.

Jimmy also received the first place award (physical category) in the Carl Steele Elementary School Science Fair by building an analog computer.

His computer will be entered in the Torrance Unified School District Science Fair, representing Carl Steele Elementary School.

## MANAGER'S POST AT CAROLINA GOES TO JACK BEATTY

J. S. "Jack" Beatty has been transferred from Northrop Norair to a new post as manager of Business Administration Operations for Northrop Carolina.

Since joining Northrop in 1952, Mr. Beatty has held a number of important positions with Contract Administration functions, including his last assignment as director of Aircraft Contract Administration.



Mr. Beatty

Mr. Beatty holds a BA degree in Economics and an LLB degree from the University of Cincinnati. He is a former Air Force navigator and was engaged in the practice of law prior to joining Northrop.

At Northrop Carolina Mr. Beatty will be responsible for Contract Administration, Pricing, Accounting and Financing, Data Processing and Industrial Relations.

A. H. "Andy" Anderson has been named to succeed Mr. Beatty as director of Aircraft Contract Administration at Northrop Norair by Paul H. Champion, manager of Contract Administration.

Joining Northrop in 1942, Mr. Anderson moved up through a succession of responsible positions in Materiel, Special Weapons department (Snark) and Contract Administration. He has recently served as chief of Administrative Services for the Site Activation department, then as general supervisor and more recently as chief of T-38 and Advanced Systems group of Contract Administration.



PLANNING A BIG NIGHT—Eleanor Heldt, Disneyland director of group sales, and Norair's Dick Pryor, use huge map of the "magic kingdom" to plan all Northrop night there May 27. Unlimited use of all attractions, from 8 p.m. to 2 a.m., will be possible with \$3.95 ticket now available through Northrop ticket outlets. Harry James and Xavier Cugat will head entertainment.

## LEADERS IN THEIR PROFESSION

## The Skinner Brothers: A Twin Triumph Over Handicap

One of the most unusual ceremonies in the history of Northrop service awards took place recently and brought to light an inspirational story of two men's personal triumph over a handicap they have shared since birth.

Roger and Robert Skinner, the personable twins whose smiling faces are a familiar sight around Northrop Norair's Engineering and Science Center, received their 20-year service pins from Paul Wierk, Corporate director of Management Information.

Presently senior scientific programmers in Northrop's Data Processing department, both men have been deaf since birth.

"The 20-year pins these men wear in their lapels not only symbolize the growth of data processing in our dynamic industry, but symbolize a personal victory over their handicap," Mr. Wierk said. "They have done what few people could ever hope to accomplish under similar circumstances: they have become leaders in one of our newest and most demanding professions."

The men's deafness is certainly no handicap when it comes to their job. They are skilled artisans at lip reading and grasping their assignment very quickly.

R. N. Kandalaf, engineering specialist in Norair's Flight Mechanics branch, commenting on a recent assignment Roger and Bob did for him, said:

"Their work on a six-degree-of-freedom problem involving differential

equations of motion was outstanding. They are excellent programmers—the best here or anywhere else."

The twins were only a year out of Tri-State College in Indiana, each with a degree in aeronautical engineering, when they joined Northrop in 1946. They started their careers as mathematicians in the Stress Analysis group which, at that time, was working on the famed "Flying Wing."

In 1950 Roger and Bob put their math and engineering backgrounds to work for Northrop's budding data processing organization. In that era of the BINAC and the "plug board," the twins were classed as computer oper-

ators, a breed of people who were the first programmers.

Today, the twins like to think of themselves, professionally, as programmers rather than mathematicians or engineers.

In the intervening years the Skinners contributed to the development of the F-89 interceptor series, the T-38 and F-5, and the Laminar Flow Control experimental airplane.

For the latter, Roger journeyed to the Cornell Aeronautical wind tunnel in Buffalo, New York, in 1962, to perform computer studies and data reduction, while Bob was providing programming

support to Jet Propulsion Laboratory on the Block IV Ranger program.

"Their personnel files are full of commendations," says Bob Mullings, their supervisor in the Scientific & Engineering Programming group. "I hope they'll stay around another 20 years."

The twins and their families are neighbors, making their homes in Northridge. Bob is teaching an evening extension course on "Introduction to Data Processing" to a group of deaf adults at San Fernando State College. Both men have taken graduate mathematics and computer courses at UCLA.

In their efforts to help others with similar handicaps, the twins are both officers of the Far West Athletic Association of the Deaf, one of seven regions comprising the American AAD. Bob is president and Roger is secretary-treasurer.

The AAAD is an organization to promote sports activities among deaf clubs across the country. It was organized in 1945 and now numbers 115 different clubs in the U.S.

This year the Los Angeles club basketball team won the Far West region title over 16 other clubs in California, Nevada and Arizona and went on to win the national championship in Boston. Bob took his vacation at that time in order to accompany the team.

Although no longer active players, the brothers are avid basketball fans. Both played on a Northrop team which won the 1954 inter-plant championship.



UNUSUAL CEREMONY—Bob Skinner (right) and his twin brother Roger flank Corporate Director of Management Information Paul Wierk during 20-year service pin presentation to Bob recently. Roger will receive his 20-year pin in June.



## AD ASTRA PER ASPERA

## A Look at Underseas Propulsion

By the NORTHROP NEWS Staff

One of the members of the Deep Submergence Program staff at Nortronics Anaheim tells us there is a saying circulating among marine sciences specialists to the effect:

"The ocean's bottom is more interesting than the moon's behind."

While Northrop is equally interested in space and the earth's ocean reservoirs, no one can deny that there has been a recent shift in public attention from outer to inner space. This is especially true in California which has more ocean frontage than any other state.



Mr. Thurston

According to Sid Thurston, chief of the Advanced Underwater Systems group at Northrop Norair, there is a need for many types of undersea vehicles to exploit and control the wealth of the oceans, and an even greater need to improve our knowledge of propulsion and hydrodynamics which is now in its infancy.

Mr. Thurston last month was chairman of a symposium in Los Angeles designed to bring together the latest information on both these aspects of marine sciences.

Sponsored by the American Institute of Aeronautics and Astronautics, the symposium was divided into two sessions—one on hydrodynamics and propulsion of underwater vehicles and another on proven utility of undersea vehicle systems.

A survey of marine propulsive devices by Dr. T. Wu, professor of applied mechanics at California Institute of Technology, included such advanced concepts as propellers in ducts which operate on a principle similar to a modern jet engine.

Others, which operate in large bubbles or cavities, function in many ways like supersonic airfoils.

Under serious consideration also, Dr. Wu said, is using two large propellers at opposite ends of a submarine, giving a control very similar to that of a helicopter and a net thrust in any desired direction.

Reducing hydrodynamic drag, which is one of the most exciting programs in the marine sciences, was discussed by Dr. J. Hoyt, head of the Research Division of the Naval Ordnance Test Station in Pasadena.

Dr. Hoyt has been conducting pioneering work in reducing hydrodynamic drag. As drag is reduced, a vehicle can either go faster or can increase its range of operation on the same amount of power and fuel.

He has been using chemicals added within the boundary layer to change the nature of the water flow around the body. Dr. Hoyt described his development as one of three major concepts for reducing drag.

He mentioned Northrop's efforts to control the boundary layer by suction through slots (the same concept employed in Northrop's Laminar Flow Control experimental aircraft, the X-21).

The other concept, advanced by North

American Aviation, involves control of the shape of the vehicle.

"These techniques all act to change the flow in the boundary layer and therefore reduce the drag," Dr. Hoyt said. "Future marine craft will use these concepts for attaining high speeds and long ranges."

Other papers presented covered powerplants for underwater propulsion of small bodies and an analysis of the porpoise as a model for study of the undersea environment.

Dr. Andreas B. Rechnitzer of North American, Inc., was chairman of the afternoon and evening sessions on undersea vehicles.

Mr. Thurston, who served as chairman of the morning session as well as over-all symposium chairman, is himself a major contributor to our knowledge of hydrodynamics and propulsion. His activities cover 20 years and include some of the first successful axial flow pump jets (jet propulsion systems) for marine vehicles; soluble coatings for reduction of hydrodynamic drag; and unique types of turbine powerplants for undersea vehicles.

## PEOPLE IN THE NEWS

William Coffey, Northrop Norair process analyst in Quality Control, was special speaker at a Quality Control workshop staged by the Metal Finishing Industry April 23 at Rodger Young Auditorium in Los Angeles . . . D. J. Harnett, Corporate director of Contracts & Pricing, was a session moderator and chairman in Los Angeles at the annual symposium on government contracts sponsored by National Contract Management Association. The April 15-16 symposia were held concurrently in Los Angeles and Washington, D.C.

Dick Hoffman, head of Public Relations at Northrop Nortronics, is a member of the Public Relations committee for the 1966 Western Electronic Show and Convention (WESCON) scheduled August 23-26 in Los Angeles . . . Bernerd Gaiennie of Norair Manufacturing R&D presented paper on "Joining Methods With Emphasis on Diffusion Bonds" at National Aeronautic Meeting and Production Forum of the Society of Automotive Engineers in New York.

Howard F. Marx of Norair Marketing was lecture series chairman for four sessions on cost effectiveness at the AIAA's Los Angeles section. He was moderator of final panel discussion April 27.

Honeycomb panels brazed with titanium-based alloys was the subject of a recent paper presented by L. H. Stone and R. E. Herfert at the American Institute of Metallurgical Engineers annual meeting in New York . . . B. A. Tueling, chief of Avionics and Weapon Delivery group at Norair, has been nominated as an official of the greater Los Angeles Chapter of the G-AES for the 1966-67 administrative year.

A. H. Freedman and Dr. E. B. Mikus discussed brazing of Columbium honeycomb structures at the American Welding Society's 47th annual Meeting and Exposition in Cleveland, Ohio, last month . . . Dr. W. B. Fallis was coordinator of a recent symposium on advanced unmanned deep space missions at the Los Angeles AIAA.



**BEST INDUSTRIAL ADVERTISING**—Northrop Advertising Manager Ward Lauren and assistant, Marie MacDonald, admire Sweepstakes Trophy won by Corporate advertising campaign in competition held by Association of Industrial Advertisers. Ads shown won first place in trade magazine category plus best over-all.

## NORTHROP AD CAMPAIGN WINS TOP HONORS IN AIA COMPETITION

Northrop's Corporate advertising campaign for fiscal 1966 won top honors as the "most outstanding entry" in the 10th annual competition of the Association of Industrial Advertisers (AIA) held in Los Angeles last month.

The company's campaign initially was awarded first place in the category of Trade Publication Advertising — Black and White. A Certificate of Achievement was presented at the AIA annual banquet to signify the honor.

Following the category awards Northrop was given a handsome trophy representing the Sweepstakes Award for the best over-all entry in the competition.

Five individual advertisements were entered to represent Northrop's "corporate capabilities" campaign for the current year. The ads described the following subjects: Northrop Ventura's Cloverleaf parachute; Northrop Nortronics' Vigicon information display system; the new GR-G5 gyroscope produced by the Precision Products department of Northrop Nortronics in Massachusetts; the company's work in spacecraft landing systems and research vehicles at Northrop Norair and Northrop

Ventura, and the navigation system for the C-5A to be built by Northrop Nortronics.

A total of 262 entries were submitted by companies from Chicago to the west coast, according to AIA. Among the local aerospace companies with which Northrop's advertising campaign competed were North American, Litton, Marquardt, Douglas, Lear-Siegler, Hughes Tool, Hughes Aircraft, TRW, and a number of smaller companies.

Other major industrial advertisers included Philco, Union Pacific, Sterns-Rogers, Aeroquip, Signal Oil, Motorola, and Ampex.

Northrop's advertising program is directed by Norman Warren, Corporate director of Public Relations and Advertising. Advertising manager is Ward Lauren. The company's advertising agency is Doyle Dane Bernbach, Inc.

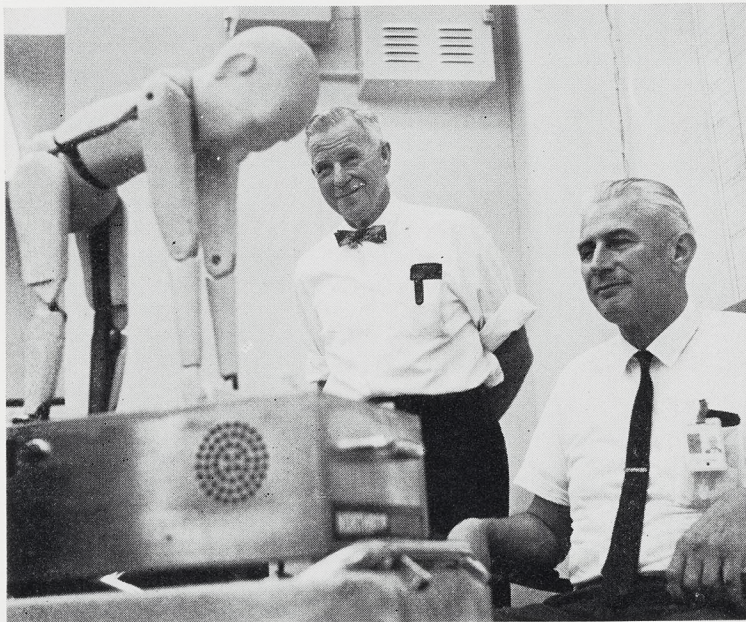
## NRC Considers Trip To Canadian Exhibit

Northrop Recreation Club is considering sponsoring a visit to Expo 67, the popular name for the 1967 Universal and International Exhibition which will run for six months next year in Montreal.

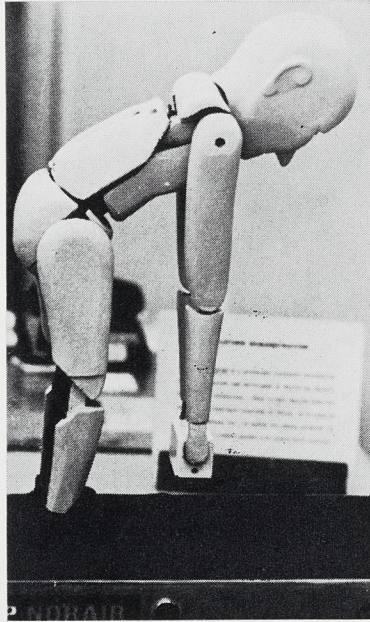
The Exhibition is being planned as a highlight of the 100th birthday of the Canadian Confederation. "First category" status was awarded Expo 67 by the International Bureau of Exhibitions, which puts it on a higher level of recognition worldwide than even the New York World's Fair.

Northrop employees attending the Exhibition might find some old friends there, since Northrop now maintains offices in Montreal in connection with the Canadian F-5 program. The CF-5 will be produced in Montreal by Canadair, Ltd., through a licensing agreement with Northrop.

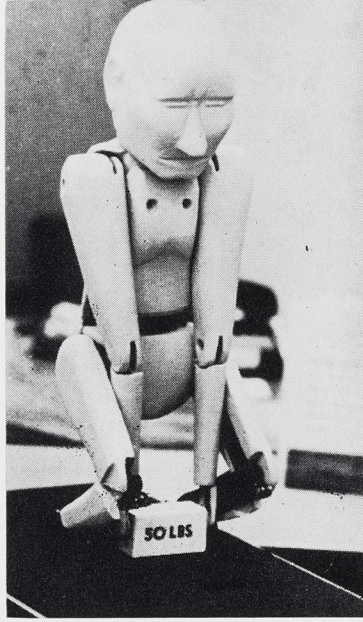
The Canadian Government has invited some 150 countries and international organizations to participate in Expo 67. Its theme is "Man and His World."



**ANIMATED SAFETY SALESMAN** — Harry Barnett (center) and George Putnam patiently wait while Lifty Louie, a mechanical man designed to illustrate manual lifting techniques, goes through demonstration of wrong way to lift weight (left and center photos). A few seconds later, Louie does it the right way (right photo). Mr. Barnett, of Advanced Production at Northrop Norair, designed and



built the device in his spare time. Mr. Putnam, of Norair's Safety branch provided the tape-recorded dialogue for the 90-second demonstration. Louie made his debut at the recent 13th annual Western Safety Congress and Exhibit in Los Angeles. Another highlight of the Congress was a presentation by Zero Defects Program Director D. N. Petersen on the ZD program at Norair.





# Classified

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private business are not accepted. The Northrop News reserves the right to edit or omit ads. Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

## For Sale

**Lawnmower**, Craftsman, power, reel-type, 3 yrs. old, \$30. Hollydale, ME 3-2395. A

**Volvo**, 1958, \$175. Inglewood, 674-1885. A

**Ford**, 1956 convt., \$175. Manhattan Bch., 379-2649. A

**Pup**, Weimaraner, AKC reg., 11 mos. old, \$50. Gardena, 324-7442. A

**Boat**, 25', 20 scoop tank, \$1500. Hawthorne, OS 5-7729. A

**House**, 3-bdrm., 2-bath, view of city, walk to grade school & shopping, new drapes & carpeting, \$32,950. Torrance, DA 5-5245. A

**Home**, 2-bdrm., in Westchester, lge. lot, dble. gar., near schools, shopping, 5 1/4% FHA loan, low dn., \$23,850. L.A., 645-5169. A

**Acreage**, near Willow Springs, in Antelope Valley, E. Kern water dist., 5 to 20 acres, \$495 acre. Torrance, FR 8-1026. A

**Surfboard**, orig. cost \$100, \$75. Box 901. A

**Printing Equipment**, compl. small shop incl. 8" x 11" power press & 12 cases of type, \$375. Lawndale, 370-3821. A

**Auto Evaporator Cooler**, North Air, 2-spd. motor, floor mount, holds 4 gal. of water & ice, \$15. Hawthorne, OS 9-8644. A

**House**, 2-story, 4-bdrm., 2-bath, near schools & shopping, \$27,500. Torrance, 375-6071. A

**Dinette Set**, black & gray, \$25. Redondo Bch., 376-8545. A

**Buick Special**, 1958, auto., 2-dr., \$350. Torrance, 371-3278. A

**Impala Super Sport**, p/b, p/s, w/w tires, auto. trans., \$2135. Placentia, 714-524-0938. A

**Ford Mustang**, 1965, p/s, p/b, air cond., new tires, \$2250. Long Bch., HA 5-6816. A

**Chevrolet Biscayne**, 1961, 6-cyl., auto. trans., r/h, \$590. Inglewood, 678-1621. A

**Chevrolet**, 1950 convt., new brakes, clutch, \$125. Torrance, 328-3205. A

**Baby Crib**, \$5. No. Redondo, FR 4-0225. A

**Ford Truck**, 1/2-ton, 1956, 6-cyl., \$350. Inglewood, PL 1-0787. A

**Radio Equipment**, amateur-type SX 111 receiver, Knight 150 A transmitter, Heath Kit mobile, sell separately or \$300. Hawthorne, 676-6550. A

**TV**, Zenith, 23" Golden Video tuner on movable stand w/UHF converter, 2 yrs. old, orig. price \$260, \$125. Gardena, 327-8615. A

**Dining Room set**, walnut, table & 4 chairs, custom pads, 2 extra leaves, \$20. Lawndale, OS 5-7316. A

**Karmann Ghia**, 1958, new tires & battery, \$525. Long Bch., 397-7552. A

**Sunbeam Alpine Roadster**, 1955, eng. & trans. recently rebilt., new tires & clutch, \$400. Inglewood, 672-6188. A

**Accordian**, 120 bass La Scala, model 7432 TD, white, \$350. Culver City, 836-4934, UP 1-0999. A

**Washer & Dryer**, Hamilton, dryer 220 v, convert to 110 V, \$75 ea. or both for \$140. Torrance, FA 8-0847. A

**Surfboard**, Greg Noll, 8', \$65. Torrance, 371-1125. A

**Lot**, in Mason sec. of Forest Lawn Cemetery, \$300. Hawthorne, 676-2613. A

**Piano**, spinet, Hallett & Davis, \$350. Torrance, DA 6-7232. A

**Bedroom Set**, walnut, queen size bed, mattress, box springs, bookcase headboard, extra lg. dresser w/mirror, \$125. Inglewood, 672-7424. A

**Corvette**, 1956, 1963 327 eng., chrome wheels, 1-4 barrel, \$700. Rolling Hills Ets., 375-6764. A

**Chevrolet**, 1955 station wagon, \$50. La Crescenta, 249-9387. A

**House**, 3-bdrm., bitins, burch cabinets, bitin TV/Hi-Fi area, raised fireplace, 500 sq. ft. playroom-workshop, 2 1/2 car gar., fruit trees, walking dist. to shops, 20% dn., \$27,250. Alhambra, AT 4-5698. A

**Table Saw**, 8", tilting arbor, \$50. Anaheim, 714-776-3939. A

**T-Bird**, 1956 h/top, fresh o/haul, paint & tires, auto. trans., orig. owner, \$1275. Pac. Palisades, 454-2057. A

**Mustang**, 1965, 6-cyl., stick shift, r/h, w/s/w, \$2095. Rolling Hills Ets., 673-1097. A

**Watch**, Elgin Embraceable, 2-diamond, waterproof, shock proof, 19 jewels, in case, guarantee, \$40. Gardena, 327-0662. A

**Bar**, custom-made, 6' long, 3/2" high, 1 1/2" wide curved formica top, 4 mahogany-frame stools, cost \$300, \$150. Redondo Bch., FR 6-6415. A

**Condominium Home**, 4-bdrm., 2 1/2 bath, bitins, washer, dryer, refrig., air cond., pool, rec. bldg., enc. patio & planting area, children & pets OK, terms, \$24,995. Anaheim, 635-1686. A

**Dinette Set**, chrome, light gray marbelized w/4 chairs, \$50. Inglewood, PL 4-4052. A

**Hub Caps**, set, for Mustang, \$10. Wilmington, TE 5-9070. A

**Bassman Amplifier**, Fender, Fender Stratocaster guitar, Gibson reverb. amplifier, 1-yr. old, \$400. Manhattan Bch., 372-7441. A

## For Sale

**House**, Del Air area, 2-bdrm., paneled beamed ceiling, den w/fireplace, 3-car gar., alum. siding, 50x175 lot, close to Northrop, \$24,000. Inglewood, 676-2958. A

**TV**, Admiral, 23", radio, stereo comb., walnut cabinet, 1962 model, completely adjusted, \$200. Hawthorne, 675-4202. A

**Pup**, collie, male, 6 mos. old, AKC reg., champion stock, \$100. Fountain Valley, 714-932-4743. A

**Range**, gas, 36" oven, grill on top, copper, \$95. Wilmington, TE 4-8771. A

**Swimming Pool**, 24' x 48' Doughboy, filter, vacuum & testing equip., \$250. Torrance, 370-8958. A

**House**, 3-bdrm., 2 baths, 24x14 liv.-dining comb., 2-car detached gar., newly painted, range, washer, dryer, air cond. avail., \$2500 dn. to take over 5 1/4% GI mortgage, \$23,900. Gardena, 329-3563. A

**Camera**, Nikon 35 auto., never used, incs. wide angle & telephoto lenses, cost \$300, \$120. Box 902. A

**Stove**, white, O'Keefe & Merritt, gas, grill in middle, \$50. Inglewood, OR 1-9320. A

**Ford**, 1955, 2-dr., auto. trans., r/h, \$85. Torrance, 835-5708. A

**Ice Skates**, women's, size 7, w/guards, \$15. Manhattan Bch., FR 9-7490. A

**Exercycle**, Vita-Master, 18 mos. old, \$100. Hawthorne, OS 5-2772. A

**Encyclopedia Britannica**, book case & year books, \$125. Bellflower, TO 7-4362. A

**Stereo Hi-Fi Components**, AM/FM tuner, dual amplifiers, dual preamps, dual cross-overs, 4 speakers, stereo turntable, \$70. Hawthorne, 676-0418. A

**Outboard Motors**, 25 hp Evinrude & 7 1/2 hp Scott, \$185. Gardena, DA 4-8853. A

**Drapes**, lined, floor to ceiling, 12' wide, orange, red, gold, \$22. Box 903. A

**Stove**, Western Holly, gas, 36", griddle & broiler, \$25. Torrance, DA 9-3721. A

**Apt. Bldg.**, 9 dlx. units, 3-bdrm., owner's unit, \$12,500 yearly gross, No. Inglewood area, \$105,000. Torrance, 325-9832. A

**Wardrobe Chest**, baby's, walnut finish, 4-dwr. plus pullout clothes hanger rack, \$20. Thousand Oaks, 679-5521. A

**Mercury**, 1955, 4-dr., Monterey, a/t, p/s, r/h, w/rear speaker, \$100. Compton, 635-9082. A

**Radio Equipment**, amateur-type, Lafayette model KT 200 receiver 550 kc to 30 mc in 4 bands, Lafayette model TE20 RF signal generator 120kc to 260 mc, RCA senior volt ohmyst ac-dc vtm, many electronic comps., \$80. Torrance, 835-2367. A

**Furniture**, Salem maple & birch maple, coffee table, lge., cost \$65; \$40; end table set, 2-tier, \$35, other items various prices. Long Bch., 433-0861. A

**Porsche**, 1965, 356 c coupe w/chrome wheels, AM radio, SP tires, \$4350. La Habra, 691-9534. A

**TV**, 21" Silvertone, floor model, \$40. Inglewood, 674-0755. A

**Tires**, 5 Allstate Supertred, 9.00x15 4-ply, nylon tubeless, w/wheels, \$75. Torrance, 376-4771. A

**Chevrolet Bel Aire**, 1957 convt., Powerglide, p/s, p/b, r/h, full tonneau cover, \$495. Pasadena, 682-1450. A

**Guitar Amplifier**, Silvertone, 3 inputs, 12" speaker, 3 mos. old, 1-yr. guarantee, \$60. Gardena, DA 4-7259. A

**Beaded Bag**, handmade in Europe, blue beads & velvet drawstring, \$5. P.V. Pen., FR 8-1863. A

**Pure Honey**, sage or buckwheat, 2 lbs. \$1.00 or 5 lbs. \$2. Long Bch., GA 2-8829. A

**Encyclopedia Britannica Junior**, 20 vols., 1957 edition, \$20. San Pedro, TE 3-9430. A

**Chevrolet**, 1959, h/top, 55,000 mi., orig., \$575. Lomita, 325-9033. A

**Transceiver**, C B handheld, Heathkit mod. GW 21, 102" whip antenna compl. w/bumper mount, \$25. San Pedro, 833-2301. A

**Falcon**, 1961, 2-dr., r/h, auto. trans., \$650. Hawthorne, 675-7969. A

**Valiant Signet**, 1962, 50,000 miles on car, 13,000 on eng., r/h, b/seats, newly retreaded tires, \$800. San Pedro, TE 3-9264. A

**Volvo**, 1959, 1961 eng., new paint & headliner, chrome wheels, record player, \$500. Lynwood, NE 1-9322. A

**Honda**, 1965, 160cc, 1744 miles, incs. access., windshield, saddle bags & turn signals, \$500. Torrance, 371-7629. A

**Engine**, frame, tires & parts for Allstate compact motorcycle, eng. needs work, sell separately or \$50. Inglewood, 676-8982. A

**Wheels**, 5 American mags, 5 sports car 200 tires, fit any Corvette or Chevy, w/without disc brakes, size 650-670x15, \$250. Hawthorne, OS 5-1365. A

**Duplex**, 2-bdrm. ea., 1800 sq. ft., 2 miles from Northrop, \$26,950. Gardena, 324-5086. A

**Car Cooler**, Bon-Aire water-cooled, 12 volt, fits floor board hump over trans., incs. 110 volt transformer to use unit in home, \$25. Torrance, DA 9-2047. A

**Clarinet**, Dumont, w/case, \$75. Harbor City, 326-8033. A

**Coins**, 1964 Kennedy proof sets, \$12 per set. L.A., 939-3519. A

**Piano**, upright, Howard, \$75. Hawthorne, OS 5-5498. A

**House**, 4-bdrm., family rm., 2 1/2 baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

**Ford Falcon**, 1960, 4-dr. sedan, auto. trans., \$195. L.A., 628-3990. A

**House**, 4-bdrm., 1 1/4 bath, f/p, FA heating, bitins, block wall, 2 patio slabs, near schools, fwys., 5 1/4% FHA, \$23,850. Garden Grove, 714-892-5450. A

## For Sale

**Guitar**, Fender Malibu, Spanish-style, flat wound strings, elec. guitar neck, 6 mos. old, w/case, \$200. P.V. Pen., FR 8-2810. A

**House**, 3-bdrm., 1 1/4 bath, bitins, dishwasher, fireplace, 2-car gar., \$2000 below market, \$32,500. Torrance, FR 8-1350. A

**Piano**, Fairbanks, upright, mahogany, \$150. Box 904. A

**Boat Trailer**, small, \$25. Inglewood, OS 6-2162. A

**House**, 3-bdrm. & family rm., G.I. loan, fenced yard, 4 yrs. old, Wilmington area, \$1000 dn., \$22,750. Rolling Hills Ets., FR 5-8778. A

**Own-Your-Own Apt.**, 1-bdrm., upstairs, 900 sq. ft., bitins, 1 block to transportation & stores, pool, \$16,950. Inglewood, OR 4-7743. A

**Refrigerator**, \$125. Inglewood, 676-8893. A

**Refrigerator**, Crosley Shelvador, ant. size, small w/large freezer cap., white, \$35. Hawthorne, 675-6637. A

**Home**, 3-bdrm., fam. rm., 2 baths, liv. rm., din. rm., all elec. kitchen, bitin refrig., FA heat, covered patio, fenced backyard, in W. Anaheim, assume 4 1/2% GI loan or ref. avail., \$22,650. Orange, 633-4378. A

**Home**, 3-bdrm., near main plant, excel. cond., \$18,950. L.A., 754-9576. A

**Hi-Fi Equipment**, Garrard 98 changer, Harman-Kardon amplifier, R-J enclosure, Jim Lancing extended range speaker, \$45. Box 905. A

**Cabin Site**, tree-covered, at Lake Arrowhead, roads, water, electricity, ready for building, terms avail., \$1450. L.A., 472-3374. A

**Stove**, O'Keefe & Merritt, 10 yrs. old, deluxe model, \$40. L.A., 757-4252. A

**Ford**, 1956 sta. wagon, near new brakes & exhaust system, \$100. Westminster, 714-892-3807. A

**Wonder Horse**, largest size, \$12. Rolling Hills Ets., FR 5-9689. A

**Battery Pack**, for Sears 9" or 11" transistorized TV, \$15. L.A., 670-2564. A

**House**, 2-bdrm., fireplace, dble. garage, \$20,950. Inglewood, OR 1-3860. A

**Boat**, 14' Catamaran, 1965 Mercury 100 hp motor, rideguide trailer, complete, \$1550. Hawthorne, 327-5229, 679-4837. A

**Volkswagen**, 1966, low mileage, many extras, \$2400. L.A., 276-4543. A

**Pickup**, 1949, 3/4-ton Ford, \$150. Hawthorne, OS 9-3476. A

**Racing Bicycle**, 15-spd. Rapheal Geminiani Deraileur, many chrome extras, \$70. P.V. Ets., 375-4742. A

**House**, 2-bdrm., on 1/2 acre, off Ventura Fwy. in rural area of Oxnard, take residential or rural lot for equity, or \$16,000. 372-8502. A

**Avion Travel Trailer**, 30' Imperial, awning, reese hitch, air cond., \$3400. Santa Ana, 714-839-5663. A

**VW Bumpers**, complete w/guard, \$16. Huntington Bch., 714-897-8201. A

**House**, 3-bdrm., 1 1/4 bath, \$26,500. Gardena, FA 1-1186. A

**Cabin**, 2-bdrm., unfinished inside, on 50' x 100' lot at Big Bear Lake, water, elect. & septic tank in, \$10,950. Fullerton, 525-1677. A

**Mustang**, 1965, p/s, auto. trans., console, \$1650. Playa del Rey, 398-1458. A

## Wanted to Buy

**Tools & accessories**, small pneumatic drills, chippers, impact wrenches. Whittier, OB 3-4117. A

**Chevrolet Greenbrier Van** w/plenty of window space, late model. Hawthorne, OS 6-8331. B

**Pool Table** for home use. Manhattan Bch., FR 2-6916. B

**Cement Mixer**, either elec. or gas powered, reasonably priced. Pico Rivera, 695-1445. B

**House Trailer**, old, capable or being towed to the mountains, sleep 4 & some heating facilities. Torrance, DA 6-5558. B

**VW-Karmann Ghia**, 1957-1962, reasonably priced. Rosemead, AT 8-0207. B

**Trailer**, luggage, bumper-type w/2 swivel wheels. Hawthorne, 676-5253. B

## For Trade

**Television**, trade for good organ & will pay some. Hawthorne, 675-6020. C

## A NUTSHELL STORY



Armando Martinez, with an assist from Norair Photolab, tells a graphic story—small washer forcibly ejected, struck safety glasses, lens shattered, but Mr. Martinez uninjured. Besides knowledge he has prevented possible eye injury, Mr. Martinez is also a candidate for Wise Owl Club of America.

## FREE (To Be Given Away)

**Doghouse**, for small dog, all wood, can be remodeled, assembles in 3 secs. Torrance, 370-4025. D

**Need reliable homes** for puppies, part bassett. Inglewood, OS 6-6412. C

## Rentals Offered

**Cabin**, Green Valley Lake, reserve now for summer vac., \$35 weekends, \$60 wk. Torrance, 320-2002. E

**Apt.**, 1-bdrm., deluxe, bitins, pool, \$95 mo. Redondo Beach, 376-2117. E

**Apt.**, 3-bdrm., 2 1/2-bath, bitins, pool, new condominium, \$295 mo. Rolling Hills Ets., DA 5-5609. E

**Home**, 4-bdrm., 2-baths, family rm., encl. atrium, lge. yard, \$350 mo. P.V. Ets., 377-3858. E

**Vacation Cabins**, Idylwild, secluded, stream, patios, \$20 to \$30 weekend, \$60 to \$70 wk. L.A., PL 4-5288. E

**Apt.**, 2-bdrm., unfurn., disposal, carport, laundry rm., 9 miles from Northrop, 1 child OK, \$90 mo. Lynwood, 635-3784. E

**Need bachelor roommate** to share lge. apt., furn., 2-bdrm. w/pool, 4 blocks from Northrop, \$70 mo. Gardena, 321-0928. E

**Cabin**, Lake Arrowhead, near lake & village, fireplace, bar, patio, \$55 wk., \$25 weekend. N. Hollywood, 761-9645. E

**Sleeping Room**, bachelor's, pvt. entrance & bath, utilities furn., close to all shopping & Northrop, \$45 mo. Hawthorne, 676-7328. E

**Apt.**, 1-bdrm., ext. lge., bitins, gar., water & trash pd., close to Northrop, \$90. Hawthorne, 325-5705. E

**Apt.**, 2-bdrm., near So. Bay Shopping Center, bitins, children OK, \$110. Redondo Beach, 374-5879. E

**House**, 2-bdrm., to share w/another man, 10 mins. from Northrop, \$70. Torrance, DA 3-8333. E

**Apt.**, furn., 1-bdrm., gar., \$110 mo. Manhattan Bch., FR 4-0750. E

**Apt.**, 2-bdrm., 2-bath & 3-bdrm., 2-bath., unfurn., dishwashers, air cond., pvt. balconies, sound proofed, sub. parking, from \$152. Inglewood, FR 5-0867. E

**Apt.**, 3-bdrm., 1 1/4-bath, near Del Amo Shopping Center, \$165 mo. Torrance, FR 1-1308. E

**House**, 4-bdrm., unfurn., 2 baths, dble. gar., bitins, fireplace, patio, \$185 mo. Westminster, 714-531-7138. E

**Roommate**, girl, wanted to share apt. w/ heated pool, share expenses, \$55 mo. Hawthorne, 676-8621. E

**Apt.**, 1-bdrm., furn., 1 block from Northrop, closed gar., newly decorated, adults only, \$80. Lawndale, OS 6-5425. E

**Bachelor Apts.**, furn., pvt. entrances, 4 short blocks to Northrop, all utilities paid, \$15, \$16, & \$20 wk., San Pedro, TE 3-2512. E

**House**, 1-bdrm., Inglewood area, dining rm., service porch, water & trash pd., redecorated, \$90. Gardena, DA 3-4116. E

## Rentals Offered

**Vacation Cabins**, Lake Gregory & Crestline, make reservations early for May thru Sept., \$25 weekends, \$60 wk. Venice, EX 1-2040. E

## Rentals Wanted

**Travel Trailer** for 2 weeks in August. Torrance, 371-9730. F

## Personals

**I would like** to thank everyone, especially in Orgn. 8837 for their expressions of sympathy & kindness during our recent bereavement. ALICE COFFEY. L

## For Sale or Trade

**Lathe Chuck**, Atlas, 3-jaw univ., 5" dia. \$30 or trade for revolver, .22 cal. auto., dble. action or rifle w/scope. Box 905. M

**MGA Roadster**, 1962, 1600 Mark II, r/h, \$1200, or consider sports car in trade. Port. Bend, 377-8444. M

## Going my way?

### Rides Wanted

7:30 a.m. — 4:15 p.m.

**Hermosa Ave. & 26 St.**, Hermosa Beach. Penny Prouty, Norair, exts. 1126, 1127, OS 9-6520. 3

**El Segundo & Doty**, Hawthorne. Panya Noguera, Mariposa, ext. 4268, 644-2039. 3

**Melrose & N. Vermont Ave.**, Los Angeles. Catch ride anywhere near Hollywood Fwy. & Vermont Ave. Will pay \$5 wk. John Kayser, Norair, exts. 1052, 2015, NO 5-2046. 3

8 a.m. — 4:45 p.m.

**Figuroa & Anaheim**, Wilmington. Need ride home. Tom Henrich, Norair, ext. 2425, TE 5-9070. 5

**From Thousand Oaks**. Seth O. Lewis, Norair, ext. 1412, 805-495-9410. 5

**Alondra & Central**, Compton, James R. Jones, Norair, ext. 2024, 537-1689. 5

**Portofino Anchorage**, Redondo Beach. H. G. Young, Johnson Bldg., ext. 563, FR 6-9494. 5

**Orange Ave. & Del Amo Blvd.**, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 5

**Jefferson & La Brea**, Los Angeles. Sheldon Ossoff, Norair, ext. 1016, 837-2916. 5

### Rides Offered

7 a.m. — 3:45 p.m.

**So. San Diego Fwy. & Westminster Ave.**, Huntington Beach. Mort Schulman, Norair, ext. 2597, 714-892-5018. 12

8 a.m. — 4:45 p.m.

**From Thousand Oaks**. Seth O. Lewis, Norair, ext. 1412, 805-495-9410. 15

**Orange Ave. & Del Amo Blvd.**, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 15

**Jefferson & La Brea**, Los Angeles. Sheldon Ossoff, Norair, ext. 1016, 837-2916. 15

# BOEING LINE: A 20-Year Association

(Continued from page 2)

air in the morning and the required parts were en route to the scene by late the same day. Many similar incidents have been recorded in which Norair reacted quickly to provide components without interfering with regular production rates.

A highly skilled, although relatively small, group of veteran Northrop employees man subcontract production facilities, working for Superintendent W. J. Minner's Subcontract Operations.

They are, in Mr. Minner's words, "Northrop's finest."

General Foremen J. L. Holman (outer wing) and Leo Sacks (aft fuselage) are directly responsible for an assembly line force of 165 employees.

"Many organizations and functions also play important parts in the over-all program," Mr. Minner adds.

Noteworthy and continuing contributions are attributed to men like Guy Kirby and his Quality Control personnel, Arthur Marta and others from Tool Engineering, Joe Purvis of Planning, Lee Robinson and Wendall Howard of Contract Administration and many others.

Boeing maintains a resident office at Norair staffed by Fred Walker and Jim Thomas, Quality Control specialists. Bruce Frost of Boeing's Los Angeles regional office helps coordinate over-all activities.

At Renton, Washington, Norair's Ed Sellinger operates a resident office within the Boeing plant.

With the exception of some cast forgings, Norair fabricates outer wings and aft fuselage assemblies from raw materials. Completed assemblies are ready for mating upon arrival at Boeing.

Normal shipments find two complete ship sets of components riding aboard two railway cars.



## High Altitude Chute Test Set by NASA

Three Northrop Ventura parachutes — Ringsail, Annular and Wagon Wheel—which are under consideration for landing space capsules on Mars will be tested this summer at an altitude of about 130,000 feet, where the earth's atmosphere most closely simulates that of Mars.

The project will be carried out by NASA in cooperation with Jet Propulsion Laboratory, manager of the Voyager spacecraft program to put an unmanned instrument package on the planet early in the next decade.

The project announcement follows recommendations presented March 29 by Northrop Ventura's R. N. Worth at a three-day AIAA meeting in Baltimore on "Stepping Stones to Mars."

In his paper, Mr. Worth, who is project manager of Planetary Landing Systems for Ventura Division, said:

"A substantial number of tests must be conducted at altitudes between 100,000 and 150,000 feet in the earth atmosphere, simulating various Mach numbers as well as velocities to produce the data required to substantiate deployment and inflation characteristics, stability, and equilibrium performance predictions."

Northrop Ventura studies have taken into consideration the estimates of the extremely rare Martian atmosphere based on data provided by Mariner 4 in its flyby of the Red Planet last year.

Both balloons and rockets will be used to carry the experimental payloads from White Sands, New Mexico, to their test altitudes, NASA acknowledged last week. NASA responsibility for the Voyager landing system is vested in the agency's Langley Research Center.

## Anaheim Employees Sold on 'Their' Angels

Nortronics Anaheim personnel have made a point — they are firmly behind their new neighbors, the California Angel baseball team.

Northrop obtained 250 tickets to an April 23 Minnesota-Angel game and 177 of them were sold at Nortronics Anaheim. Now NRC is taking steps to help groups of fans who may like to attend a home game complete arrangements. Contact Personnel Activities for information.



**ART PATRONS GATHER**—Scene above, captured year ago, will be repeated May 21 when NRC Art Club stages its second annual "Carnivale de Arts" at NRC Clubhouse, Fullerton. Exhibit will feature original work of club artists, children's competition, movies and door prizes.

## NORTRONICS VETERANS



Frank Lynch (left), Nortronics vice president and manager of Operations, poses with three 25-year veterans and their spouses during recent Nortronics Management Club meeting. Honors were paid for service dating back to early

1941. Those honored (from left) are Mr. and Mrs. Al Vogel, Mr. and Mrs. Howard Baker, and Mrs. and Mr. Bill Nelson. Men received 25-year service emblems, plus certificates. Mrs. Baker is a former Nortronics employee.

## EARNINGS

(Continued from page 1)

\$314,000,000 at the same time a year ago.

"With the results to date and the business already in hand," Mr. Jones said, "it seems clear that the current fiscal year should exceed last year in both earnings and sales. Our ratio of net earnings to sales has been improving steadily, and this favorable trend is expected to continue," he said.

"We expect new contracts received during this fiscal year to exceed \$500,000,000 by the end of the year," Mr. Jones said, "and this does not include any of our participation in the new Boeing 747 transport program."

"While the outlook for our military aircraft business, both the F-5 and the T-38, continues bright into the future, the recent growth in new contracts is in fields other than aircraft, Mr. Jones said. New contracts for communications systems this year should total about \$95,000,000, as compared with about \$17,000,000 the previous year. In surveillance, reconnaissance and intelligence processing systems, new contracts received should go from about \$4,000,000 last year to about \$10,000,000 this year. New ordnance contracts this year should total about \$24,500,000, as compared with about \$4,800,000 last year, Mr. Jones said.

"We are also beginning to build up our preparations for work on the Boeing 747 airliner, and our engineers are already at work at the Boeing plant in Renton, Washington. Sales on this program should hit a peak of as much as \$90,000,000 annually in 1969-70," Mr. Jones said.

## V/STOL Recommendations Submitted in Germany

Recommendations for the design of an advanced V/STOL fighter were included in a 2500-page document submitted recently at the conclusion of a joint U.S./West Germany study program.

Northrop Corporation and Vereinigte Flugtechnische Werke GmbH (VFW), a leading West Germany aerospace firm, carried out the study under a cooperative agreement.

This program was conducted under the cognizance of S. L. "Pete" Shaw, Northrop Norair director of Advanced Aircraft Systems. C. L. "Cliff" Adcock, chief of V/STOL Aircraft, was directly responsible for Northrop efforts in the program. Adam L. Roth, Northrop team leader in Germany, did an outstanding job in guiding the study effort in Germany.

"In addition to helping us establish close relations with one of Europe's leading aerospace firms, this study program greatly enhances Northrop's capability to perform future development work in V/STOL aircraft," Mr. Shaw said. "There now exists a strong indication that future cooperative work of a follow-on nature may occur."

Following agreements reached early in 1965, some 20 Norair men began arriving in West Germany to carry out the study. At some points in the work that followed, Norair's work force totaled as many as 30 key men.

## Anaheim to Sponsor Table Tennis Tourney

A table tennis tournament, tailored to family participation and open to all Northrop personnel, will be staged from 1 to 5 p.m. Sunday (May 15) at the Brookhurst Junior High School gym in Anaheim.

Nortronics Anaheim NRC is sponsoring the event with J. H. Flannagan, NRC commissioner as director.

Planned are men's singles, junior singles and either father-son or father-daughter doubles. Players must wear tennis shoes and furnish their own paddles.

Entry blanks are available through Personnel Activities with deadlines set for tomorrow (May 12).

Selected for this assignment were experienced Technical employees with extensive backgrounds in many programs. Included were senior engineers, engineering specialists, senior designers, and aerodynamicists, to mention a few.

"Our study program personnel offered a key asset to the program — experience and know-how," Mr. Adcock said. "They provided valuable assists in all phases of engineering as well as other fields—program planning, scheduling and others."

Study program efforts centered at VFW's Bremen, Germany, facility although certain work was performed at another facility located in Munich. These efforts were supplemented by aerodynamic, avionic, human engineering maintenance and reliability studies conducted at Hawthorne.

Approximately 150 employees of VFW worked closely with Northrop representatives on the program.

Dispersed throughout VFW elements, the Norair men had an unusual opportunity to know and associate with West German counterparts, not only at work, but also on a social basis.

## HAWK

(Continued from page 1)

a peak of some 150 by the time full-scale assembly operations are reached late this year or in early 1967.

"We have been fortunate in being able to recall veteran Hawk production personnel from other projects," said Ray Schultz, director of Manufacturing. "This key factor — the availability of experienced personnel — will enable us to attain a full capability in the shortest possible time span."

Mr. Schultz has selected key supervisory personnel with previous experience in Hawk work to guide efforts in the new program.

Grant Gunderson, chief of Production, heads the over-all work force with "Nick" Niccoli as superintendent. Important assignments fall to General Foremen Pete Falk (Machine shop), Ed Paul (Processing) and Hugh Zebarth (Welding).

## GPL Named To Supply C-5 Doppler

Northrop Nortronics has selected the GPL Division of General Precision, Inc., Pleasantville, New York, to supply the doppler navigational radar for Northrop's inertial-doppler navigation system under development for the Lockheed-U.S. Air Force C-5A.

Northrop awarded GPL an initial contract in excess of \$1 million for the complete doppler radar subsystem, including antenna, electronics and doppler indicator. Northrop Nortronics is responsible for development, test and production of the navigation system of the world's largest aircraft as a contractor to Lockheed-Georgia Company, a division of Lockheed Aircraft Corporation.

Selection of GPL as the C-5A doppler radar supplier was made on the basis of price and other factors following review of proposals from several companies.

To achieve maximum accuracy and back-up capability, the giant USAF transport will be the first cargo plane to employ a system which combines both doppler and inertial navigational techniques.

Lockheed-Georgia is developing the C-5A at its Marietta, Georgia, plant, and will deliver the first plane to the Military Air-lift Command in 1969.

## ART CLUB TO STAGE SECOND ANNUAL EXHIBIT MAY 21

Nortronics NRC's Art Club will stage its second annual "Carnivale de Arts" beginning at 7:30 p.m., May 21 at the NRC Clubhouse, Fullerton.

This event, which attracted more than 200 participants last year, is a full-scale art exhibit featuring the work of the 25 club members, plus a well-rounded added program.

Plans call for movies, door prizes, refreshments and a special children's art exhibit with prizes. Member exhibits will include works in oil, water colorings and other media.

Ed Mosher is serving as show director.

A \$1 donation is required of adults and children are admitted free. Door prizes will include original paintings. Tickets may be obtained through Nortronics outlets.

## Fuller Lands 16-Pound Sea Bass to Win Derby

"Chuck" Fuller, Fixture Engineering, Nortronics Hawthorne, boated a 16-pound white sea bass to take first in the NRC Sea Angler's initial deep sea derby of the year April 23.

Barracudas accounted for a second through fifth place awards which went to Don Caughlin, Frank McGinley, Sam Murankie and Charles Fuller jr. respectively.

Skin diving films will be featured at a May 17 meeting at the NRC Clubhouse at 7:30 p.m. and the next scheduled derby will be held May 21.

## Acquaintance Dance

Tickets for an NRC Auxiliary-sponsored "Acquaintance Dance" May 21 (9 p.m. to 1 a.m.) at NRC Clubhouse, Hawthorne, are still on sale at ticket outlets.



## 'No Squawks' Record for Vietnam F-5

Two Air Force ground crewmen assigned to a Northrop-built F-5 fighter in action in Vietnam have claimed for their aircraft what might be a new record for the number of consecutive combat missions flown by an aircraft without an operational discrepancy.

That record: 34 consecutive combat sorties.

Which means that during this period the pilot has not been forced to write a report which might cause the aircraft to be grounded for such reasons as a malfunctioning part or component, damage, or an inoperative system.

Involved is an F-5 maintained by S/Sgt. Dennis A. Christensen, crew chief, and A1C John G. Hooker, assistant crew chief, both of the 10th Fighter Command Squadron.

Donald Kindy, Northrop Norair technical representative assigned to the 10th FCS, verifies the figures, adding that the aircraft now has flown 282 combat sorties against the Viet Cong.

(Figures covered the latest report issued in mid-May.)

The Northrop F-5 arrived in Vietnam in October 1965 as part of the "Skoshi Tiger" evaluation contingent of aircraft. It was the first of the F-5's in this group to log 100 combat missions. Following completion of the evaluation program, all F-5's were turned over to the 10th Fighter Command Squadron for permanent duty in the combat zone.

According to an Air Force story, published in Vietnam, A1C Hooker has worked with the aircraft since its arrival in Vietnam. Sergeant Christensen took over as crew chief in December. Both men report paying little attention to the no pilot's discrepancy factor until after 20 missions were logged.

## SOPHIA ADAMS

## A New Name in Centinela Art Circles

Most of us move through life harboring a desire to tackle something different—fly a plane, race a boat, write a book, take up photography, sail around the world. Few of us get around to it.

With Sophia Adams the obsession was painting. She did something about it.

"For years I stopped to admire every painting I saw, visited museums and art exhibits," Mrs. Adams said. "But with four children at home, my job at Nortronics Hawthorne and other interests, little came of it."

This stalemate ended about 14 months ago when Mrs. Adams lay down her electronic assembly tools at Nortronics, drove straight to a store, purchased the needed equipment and received brief instructions in paint mixing.

Since that time she has com-

## SIMULATING MISSILE APPROACH



Zoom lens produced by Nortronics will permit simulation testing by projecting images at increasing size, from 4 to 200 power. George Matter (left) and Allen Mann align and adjust system using 2500 watt xenon light source at (left), part of zoom lens system.

## TARGET DATE SET FOR ACQUISITION OF HALLICRAFTERS

Northrop Corporation and The Hallicrafters Company of Chicago have reached substantial agreement for Northrop to acquire all of the assets and assume the liabilities of Hallicrafters, the two companies have announced in a joint statement.

The agreement is subject to approval by both boards of directors of the two companies and other necessary clearances, including tax rulings and approvals of regulatory agencies. The target date for completion of arrangements has been set for October 1966.

It is contemplated that Northrop would issue cumulative convertible preferred stock in exchange for Hallicrafters shares. Actual number of Northrop pre-

(See **HALLICRAFTERS**, page 6)

## VWS Proves Value in Tests On Helicopters by Army

The effectiveness of a voice warning system in making less hazardous low-level helicopter missions such as those in Vietnam was successfully demonstrated in recent Army flight tests at Fort Rucker, Alabama.

During a three-month evaluation program to determine the applicability of the voice warning concept of malfunction reporting to specialized Army air missions, five Mark I NORVIPS systems developed by Northrop Nortronics logged about 1500 hours aboard tactical and medium transport helicopters and a twin engine surveillance aircraft.

Because low altitude airmobile operations demand extra pilot concentration on external terrain, NORVIPS proved particularly

significant in reducing the amount of attention normally required to monitor or interpret potential problems.

In addition, the NORVIPS tests revealed that some indications of system failure which normally would prompt the pilot to make an auto-rotation landing were in fact only instrument failures.

The Mark I NORVIPS is an advanced version of the voice warning system used on all Air Force B-58 bombers. It detects potential hazards and alerts pilot or crew with a recorded message that briefly describes the problem and gives remedial instructions.

Of particular importance to Army airmobile operations is that it allows the crewmen to concentrate on the mission with the knowledge that they will be alerted to any serious malfunction without requiring their attention to warning lights or taking the time to interpret warning bells or buzzers.

Included in the evaluation program was the first flight test of Northrop's Continuous Inflight Performance Recorder (CIPR), designed to provide a permanent record of all warning and cautionary events occurring during a mission. CIPR can also be used as a survivable crash recorder.

The tests were conducted with the participation of the U.S. Army Aviation Materiel Command, the Test and Evaluation Command, the U.S. Army Board for Aviation Accident Research and the Continental Army Command.

## NDP to Put New System In Operation

One of the most advanced, high-performance computer complexes in the world will become operational next month with installation of an IBM 360/65 system at Northrop Data Processing Operations headquarters in Hawthorne.

The third-generation computer, the second to be installed commercially on the west coast, will replace one of two existing IBM 7090 systems. The other 7090 will be retained indefinitely.

According to S. S. Lotz, director of NDP's Operations section, the model 65 of the 360 series can do more work efficiently and faster in less space and at less cost than the 7090 system.

"New computer design, especially microminiaturization of components, gives us a compactness and versatility never before obtainable," Mr. Lotz said.

"Also, the modular design of the 360 system affords us the capability of increasing our capacity and flexibility at any time by adding other related units."

Presently being installed in the Northrop Norair Engineering and Science Center, the new computer will equally serve Nortronics and Ventura Divisions through a leased Western Union Broadband Exchange Service linking Hawthorne with Newbury Park and Anaheim.

Signals from magnetic computer tapes, which are prepared by smaller computers (Univac 1004) at both Anaheim and Newbury Park, are transmitted instantaneously to another Univac at Hawthorne which, in turn, duplicates the tape.

After the data processing re-

(See **COMPUTER**, page 6)



Test of this and four other Nortronics Voice Warning System Mark I units by Army Aviation Test Board at Fort Rucker, Alabama were so satisfactory that Major Hap Reser (right) expressed desire to retain the five units that qualified VWS. With Major Reser is Al Collins, field service representative, in front of CH-47 Chinook helicopter, one of three types of aircraft used in test. UH-1B Iroquois helicopters and OV-10C Mohawk twin-engine fixed-wing aircraft were also used in test.

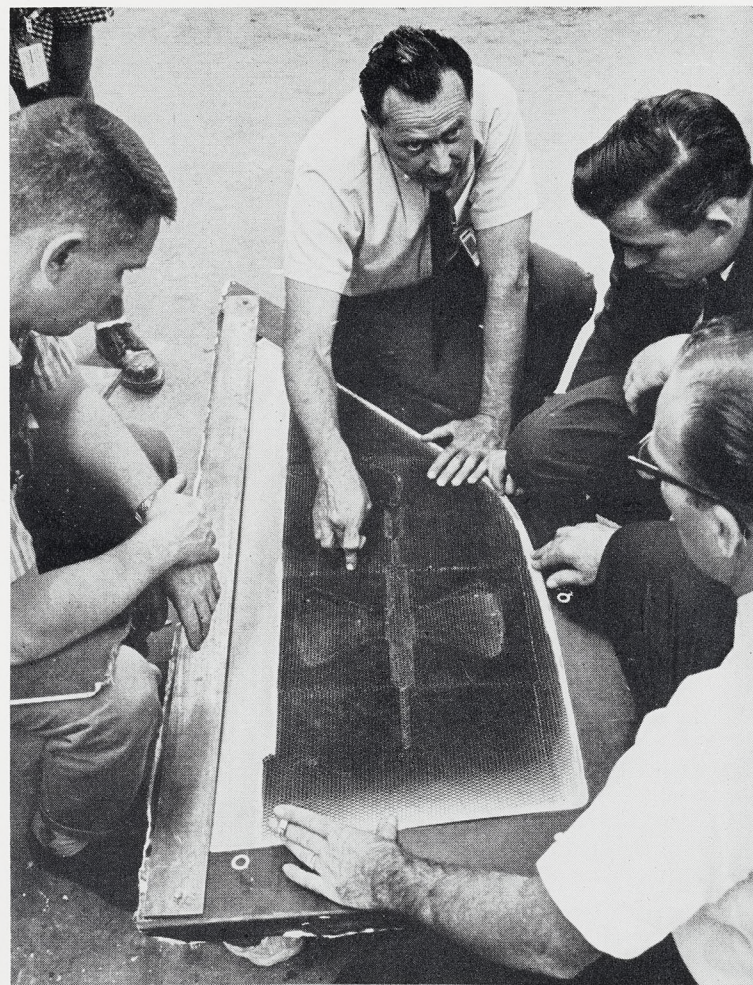


## Fortnight in Review



### F-5 IN TURKEY

Turkish citizens swarm over, under and around Northrop-built F-5 (above) at Ankara recently during official delivery ceremonies and public display of Turkey's first squadron of the supersonic tactical fighters. Dignitaries (right), both Turkish and American, review display of NATO nation's air power. After ceremonies (below), serious business of Free World defense is reflected as Turkish soldiers guard squadron. Turkey is seventh allied nation to receive the F-5. Previous deliveries have been made to Republic of Korea, Iran, Greece, Republic of China, Republic of Philippines and Norway.

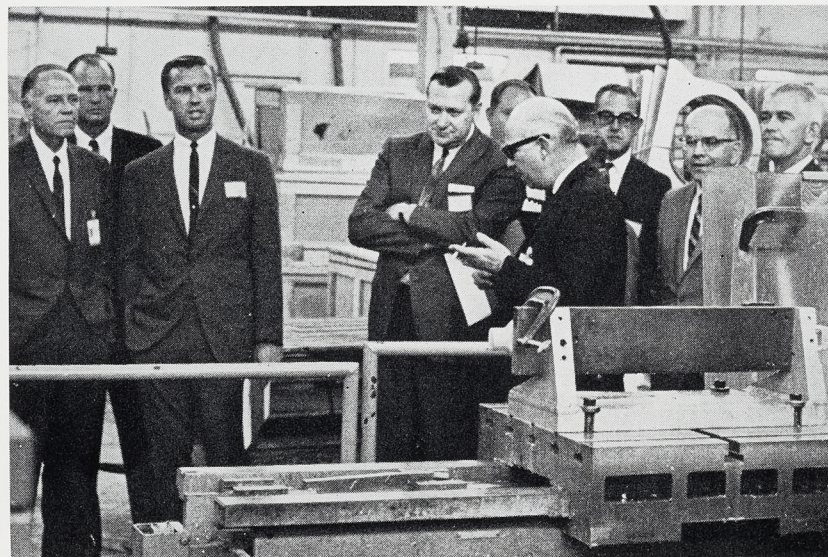


Discussing radome produced for Ling Temco Vought by Northrop Ventura are (from left) Les Spencer, Bill Lang, Ken Drake, and Tom Johnson. Radomes for both missiles and aircraft are a major product area of the Ventura Plastics Shop, which manufactures other fiberglass aircraft components. Shop will develop and produce fairings for wing and cabin of Boeing 747 jetliner.



General Wallace M. Greene Jr., commandant of the U.S. Marine Corps, awards Distinguished Flying Cross to Captain Dietrich F. Koletty, at Cherry Point, North Carolina. Captain Koletty, son of Colonel and Mrs. J. W. Koletty, received decoration for distinguished service as a helicopter pilot in Vietnam from June through September 1965. Colonel Koletty (USA, ret.) is a member of the Marketing department staff at Nortronics Palos Verdes.

### CHAMBER OF COMMERCE VISITS NORTHROP NORAIR AND NORTRONICS HAWTHORNE FACILITIES



The welcome mat was rolled out early this month for top business, industrial and civic leaders taking part in the annual Hawthorne Chamber of Commerce Day at Northrop. Ray Millman, Chamber president, emerges from Apollo pallet capsule (left photo) as Gilbert Laven, Vernon Herbst and Bob Hartman wait their turn. D. G. McNeal (center photo) gestures as he explains Automated Operations

Control activities to interested group on tour. And Ann McCormack, receptionist, and Roland Scott, Community Relations coordinator, help pin badge on Mr. Hartman, Hawthorne Chamber's general manager (right photo). Visitors toured extensive area of plant, heard top Northrop officials discuss current and future business prospects.



## 'Fighting Blood' Sought for June Bloodmobile Visit

Northrop Corporation employees will roll up their sleeves June 16 to offer "fighting blood" to help replenish depleted stockpiles of blood derivatives facing the nation's armed forces in Vietnam.

The occasion will be a bloodmobile visit to the Northrop Norair Product Display building. The hours: 7:30 a.m. to 12:30 p.m.

Defense Secretary Robert McNamara has asked for a nationwide program to supply 250,000 pints of blood to handle increased requirements in Vietnam. Los Angeles and Orange Counties are attempting to raise 17,500 pints for this purpose.

Northrop personnel, by giving blood June 16, will be helping to meet this critical need and at the same time building reserves against heavy local uses. Northrop will receive credit for its contributions from the American Red Cross and the blood given will continue to be available to employees and their families without charge through the Northrop blood program.

But due to the pressing need, this particular bloodmobile visit is more important than any in recent years and warrants the serious consideration of each employee.

Special posters outlining the program have been distributed through Northrop's Hawthorne area facilities. Employees are asked to sign them as their indication of wishing to support this effort. Those who sign will be sent regular appointment cards for the bloodmobile.



Sandy Anglin, 15, and Gary Arnett, 18, reigned as king and queen of the 11th annual Grand Medal Ball last week in Long Beach. School-age members of 40 dance clubs selected the pair for the honor. Miss Anglin is the daughter of Norair's Jess Anglin, an engineering administrative planner.

## Rodney Smith Earns Life Saving Plaudits

Rodney Smith, 14, son of Northrop Norair's Helen and Harper Smith, has received a special letter of commendation from the Surf Life Saving Association of America.

Young Mr. Smith went to the assistance of Lifeguard Paul McIlroy who was carrying out a rescue off Hermosa Beach. The rescued boy was towed to safety aboard Rodney's surfmat.

Mr. McIlroy, a member of the 1964 U.S. Olympic water polo team, lauded Rodney for his quick thinking and help noting: "Without your assistance and good timing, I feel the rescue may not have had the happy ending it did."

## BY PAGE COMMUNICATIONS

# S. American Satellite Link Studied

The Inter-American Development Bank has selected Page Communications Engineers of Washington, D.C. to conduct a feasibility study related to the use of satellite communications in South America.

Felipe Herrera, president of the Bank, met with Joseph A. Waldschmitt, Page president, and Walter E. Sutter, Page vice president and senior marketing director, for the formal signing of the seven-month \$250,000 contract.

A recognized world leader in communications system design, management and operations, Page will explore the advantages of satellite communications over conventional methods for the entire South American continent where communications between countries are often unreliable and inadequate.

A global satellite communications network, scheduled to begin in 1968, will permit any country having an earth station, or any country connected by microwave link to the earth station of a neighboring country, to communicate directly with every other country that has an earth station or is connected to one.

The Page study will serve to determine the most economic locations for earth stations in South America which would be linked to the satellite communications system, and the means of connection with local telecommunications systems. In a latter phase, a similar study will be conducted for Mexico and Central America.

The global satellite system

will be capable of providing telephone, telex, facsimile, and data traffic as well as television with program exchange and educational potential at a cost determined to be considerably less than that of existing methods.

In each of the 10 South American countries, the Page survey team will study the telecommunications network now in use or in the planning stage, the quality of existing service, future channel requirements, and fiscal arrangements for the over-all expansion plan. The governing agency for telecommunications in each country will be examined concurrent with attention to international facilities.

Among other areas to be considered are current and projected population figures in a given area; current and projected financial trade requirements; number of telephones; number of data processing centers and number of television sets.

The over-all study will be carried out with the cooperation of COMSAT, the company formed in 1963 to promote commercial communications by means of satellites. The international use of satellites for communications is regulated by an agreement which has been signed by 48 nations including Argentina, Brazil, Chile, Colombia and Venezuela.

## FRIDAY IS NORTHROP'S NIGHT TO TAKE OVER MAGIC KINGDOM

Friday is the day—Northrop Night at Disneyland—when all the features and fun facilities of one of America's greatest attractions will be available exclusively for Northrop families.

And all for a nominal \$3.95 per person.

Tickets, available at all Northrop facilities, entitle the holder to admission to the park, plus unlimited use of all rides, attractions, features, exclusive of shooting galleries, from 8 p.m. until 2 a.m.

Included is admission to the famed Tiki Room, plus the opportunity to hear such name bands as Harry James, Xavier Cugat and a host of other entertainment personalities.

The general public will be cleared from the area prior to 8 p.m.



Maestro Harry James will play for Northrop families taking part in special NRC Night at Disneyland Friday. Xavier Cugat is another entertainment headliner who will appear.

## MOTHER AND ENGINEER, TOO

# Chasing Dogs In The Wilderness Is 'Musher's' Forte

You can add seven thoroughbred Samoyed sled dogs to the contingent of Northrop engineers and their families who are moving to Renton, Washington, for the preliminary design phase of the Boeing 747 program.

The dogs belong to Mrs. Lloyd Bristol, Northrop Ventura structures engineer, mother of two children, professional dog trainer, and holder of the 1966 "Musher of the Year" title conferred upon her by competing racers in the 12th annual Big Bear Sled Dog Derby last February.

She is one of about 10 Northrop Ventura engineers who are joining about 40 structures experts from Northrop Norair at Boeing's Seattle facility where the huge 490-passenger jetliner is being designed.

Norair will build the 150-foot passenger section and Ventura will produce the fiberglass fairings for the wing and cabin as Northrop's participation in the design and manufacture of the world's largest commercial jet airliner.

Mrs. Bristol pioneered sled dog racing on the West Coast (excepting Alaska, of course), and the annual Big Bear derby, while not the only regular competition, is now the largest in the West with 23 teams competing this year in the major, long distance event.

"It was 17 years ago," she recalls, "when my husband, myself and two Samoyed pups were suddenly snowed in while vacationing at our cabin at Big Bear. We built a sled and harnesses and used the dogs to haul supplies until the roads were re-opened.

"It was so much fun, we began

breeding, raising and training Samoyeds for sled work. The idea caught on quickly and has continued to grow and spread throughout the west."

In 1955 the Bristols were asked to display the sled team in action at Big Bear, and they put together a race involving five teams. That led to organization of a club and in the following years the competition extended to Siberian Huskies, Alaskan Malamutes, German Shepherds, and even Irish Setters.

But the Samoyeds, which spread from the Ural Mountains in Russia and from which the famed Alaskan Huskies are descended, are still the best sled dogs, Mrs. Bristol feels.

The dogs have a wool coat rather than fur, and its similarity to Angora has made it a valued material for making sweaters, dresses and men's suits, she said.



Lloyd Bristol, Northrop Ventura structures engineer, steers team of pure-bred Samoyed sled dogs through snow at Big Bear, which has become west coast center of sled dog racing.

Since Southern California is not the most suitable place in the world for sledding, the Bristols and their friends have improvised by putting wheels on their sleds and racing in the desert.

"This helps to keep the dogs in shape," she explained. "They adapt marvelously to the weather extremes, and they have worked on occasion in temperatures of 70 degrees above and 12 below zero in the same week."

The drivers have to keep in shape, too, she reminded.

"Since snow in California is only found in the mountains, the race courses are usually half straight up and the other half straight down."

Average speed of a dog team is 10 miles an hour and the average race is in 15-mile sprints.

In addition to five annual races in the Los Angeles area, sledders now com-

pete at Palm Springs, Lake Tahoe and Nevada City. But the events have all been organized by people who got their start with the Bristols in Los Angeles and have since moved to those locations.

Mrs. Bristol recently learned that a competition is getting started in Oregon as well.

Community Chambers of Commerce have done a great deal to enhance the popularity of dog sled races, Mrs. Bristol pointed out, through promoting events as a means of attracting tourists during the off season.

Training a team is not too difficult if you have a good lead dog, she says, but without that lead dog you are sunk.

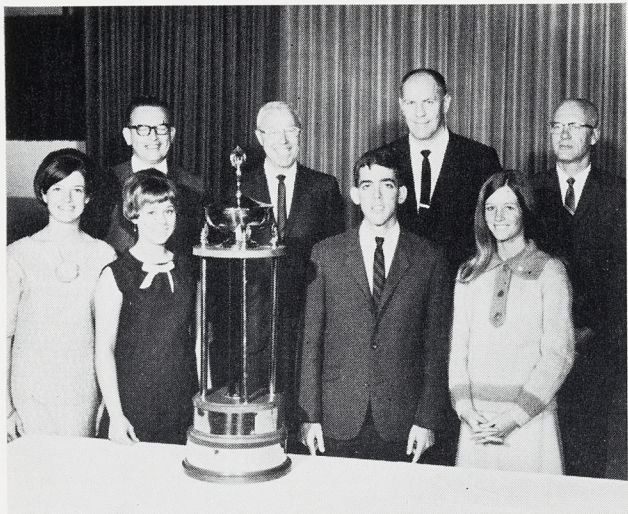
"The Samoyeds are intelligent, amenable and they like their job. An individual pup can get oriented and learn to stay in line in about a day, but it takes many weeks of work to get a team working together.

"Commands which are similar to those used with horses are easy for the dogs to learn. We don't use the word 'mush' at all. More often we'll say 'go' or perhaps just whistle.

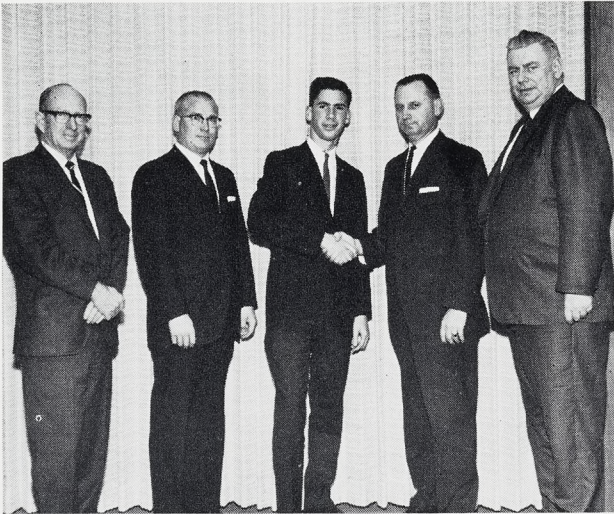
"The lead dog, however, has to possess a native intelligence which cannot be taught. For example, when he comes to a tree he has to know to swing wide enough around it that the sled doesn't smash into it."

Mrs. Bristol's nine-year-old daughter Lyn has been riding a sled since she was two, but because of club rules couldn't compete until she was eight. This year at Big Bear, Lyn finished sixth in a field of more than 40 entries in the children's race.





**SWEEPSTAKES AWARDS**—Officers and counselors of Trivco, Junior Achievement firm sponsored by Nortronics Anaheim pose with huge trophy (left) presented to Company-of-the-Year at Future Unlimited Banquet earlier this month. In center photo, Kenneth Stern is told he has been named Best Manufacturing Vice President in Southern California by judges. Norair Management Club sponsored award and past president Rollie Pontious made official presentation at banquet. Judges were Ed Laski, Harvey Cook and Tom Brazil of Norair and Gilbert Gayler of Western Airlines. In photo at right, Doug Finch receives five year J-A pin from H. E. Riggins, Northrop Ventura vice president-Administration. Mr. Finch was counselor this year to Conaco firm counseled by Ventura Division.



## TIME FOR AN ACCOUNTING

# Annual Banquet Climaxes 1966 J-A Year

Another Junior Achievement year came to its official close May 12 with the annual Future Unlimited Banquet at the Hollywood Palladium, but most of the youthful company executives and their industry counselors are still busy finalizing their annual reports and disbursing funds to shareholders. J-A firms counseled by Northrop west coast divisions were well represented at the banquet and all were recognized, either for individual or group efforts, before the evening was concluded.

The 12th annual Future Unlimited Banquet was a salute by business and industry to the 3500 teenage executives who organized and operated 172 Southland companies in the 1965-66 year and to the 500 business men and women who voluntarily gave their time to serve as advisors.

The biggest salute of all went to a firm counseled by Nortronics Anaheim — Trivco — the Southland's Company-of-the-Year for 1966. Chris Thayer, vice president for Sales, accepted the huge trophy which required two Achievers to carry it off the stage.

The two basic requirements for Company-of-the-Year honors were sales in excess of \$500 and a minimum of 80 percent attendance at all meetings throughout the year, but the real reason for Trivco's success was "the way the kids worked

together toward well understood, established goals," according to A. C. Weishaar, sales advisor.

After winning the top honors for Orange County, Trivco executives were interviewed by members of the Los Angeles Junior Chamber of Commerce, sponsors of the Southland award, prior to being named Company-of-the-Year.

Final judging involved nine firms, all selected as the best company in their respective business centers.

In other banquet activities involving Northrop, Doug Finch, Northrop Ventura coun-

selor to Conaco, Inc., was recognized for completing his fifth year of service to Junior Achievement.

The Northrop Norair Management Club, which also sponsors two firms in the Southwest Business Center, again presented an award to the Manufacturing Vice President of the Year, one of five major individual awards made annually to outstanding executives.

(Other categories, each sponsored by a different company, include best president, best marketing executive, best treasurer, and best salesman.)

Kenneth M. Stern, a senior

## NORTRONICS' WEAVER HONORED FOR SERVICE TO EDUCATION

The California Congress of Parents and Teachers has bestowed an Honorary Council Life Membership upon Don M. Weaver, general supervisor in Precision Manufacturing at Nortronics Hawthorne.

Mr. Weaver's award, which carries a scholarship in his name for a deserving student entering college, recognized "outstanding service to youth and education."

Mr. Weaver's services to



Mr. Weaver

education are extensive. He was a past president and member of the Lawndale School District Board of Education (four years). He is a member of both the California and National School Board Associations. He presently serves on the executive board of the Los Angeles County School Board Association. And he currently is a member of the Centinela Valley Union High School District Board of Education serving for the past year and a half.

In his spare time Mr. Weaver serves such civic functions as the Centinela Valley Fine Arts Association (as a founder and vice president), United Way (board of directors) and Explorer and Boy Scouts (merit badge counselor).

Mr. Weaver served in the U.S. Navy during World War II and Korea campaigns and is an Industrial Management degree candidate at UCLA and AA graduate of El Camino College. He has been with Nortronics since 1951 in Precision Manufacturing.

## World Tour Meeting Scheduled Tonight

Would-be world travelers will gather at 7:30 p.m. tonight (May 25) at NRC Clubhouse, Hawthorne, for information and films highlighting a planned NRC-sponsored around-the-world tour which departs September 2.

The 33-day excursion will hit many points in the Orient, the Far East, the Holy Land and the Greek Islands. Cost is \$1495 per person.

## UNIQUE EXHIBIT ALLOWS BLIND TO STUDY VEHICLES

Northrop Corporation has provided a 1/30th scale model of its T-38 Talon trainer for an entirely new concept in museum displays — a "Touch and See" exhibit.

"Touch and See" is for the blind who often have little concept of what sighted persons take for granted. For instance, the blind find it difficult to keep up with advancements in transportation, so the first exhibit features planes, trains, rockets, ships, cars and trucks.

The T-38 model, like the 21 other items in the exhibit, is mounted adjacent to a sign (in braille) telling about it. There is also a scale-size human figure for immediate contrast. A blind person can "read" about the trainer and at the same time "see" it through his keenly - developed sense of touch.

Originated at the Newark, New Jersey, museum, the exhibit has proven to be highly successful. Plans are now being formulated to make the exhibit available at other locations.

Special arrangements are made to allow the blind to visit the museum before regular hours and to remain as long as they desire.

## Dinner, Information On Hawaii Offered

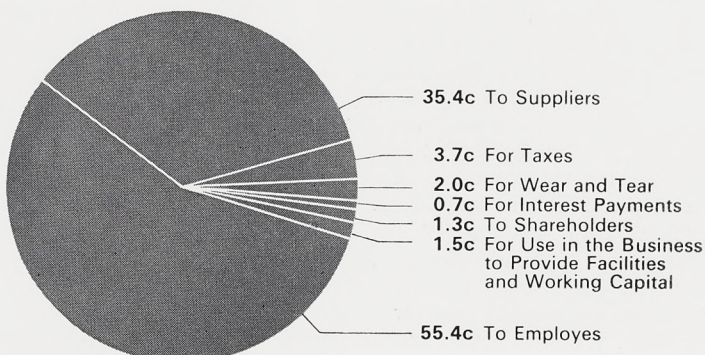
A full-course Cantonese dinner at bargain rates, plus information on the annual NRC-sponsored Christmas tour of the Hawaiian Islands will be available June 10.

That's when NRC travelers will gather at Yue's Cantonese Restaurant, 1828 W. Rosecrans, Gardena.

Surl Kim of Kim's Tours and NRC will defray \$1 of the \$2.75 dinner cost. Reservations may be made through Personnel Activities at Norair, ext. 2486.

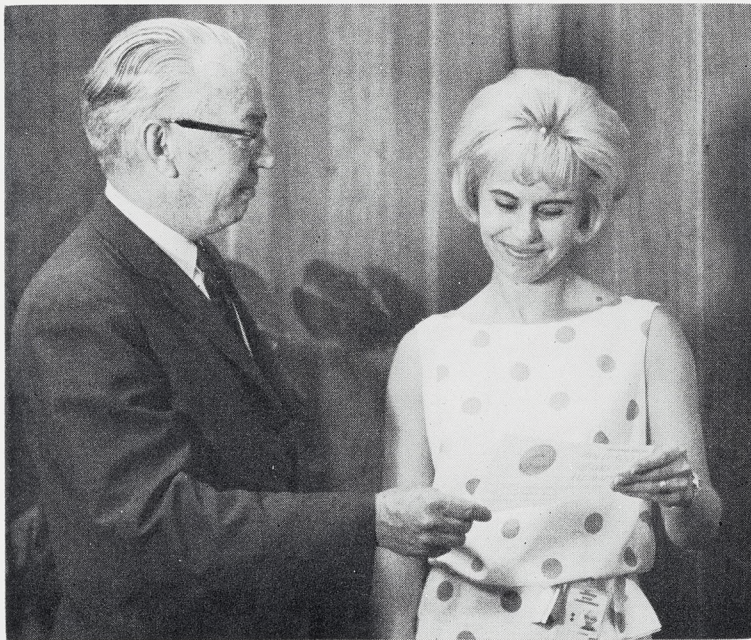
## WHERE NORTHROP SALES DOLLAR GOES

Northrop received during first nine months of fiscal 1966		
	Thousands	
From sale of its products and other income (net)	\$245,600	100.00%
<b>These receipts went</b>		
To suppliers for materials, services, etc.	86,900	35.4%
For Federal, state and local taxes	9,000	3.7%
For wear and tear on use of equipment, etc.	5,000	2.0%
For interest payments	1,800	0.7%
To Northrop shareholders	3,100	1.3%
For use in business to provide facilities, working capital	3,800	1.5%
To employees for payrolls, employee benefit, etc.	136,000	55.4%



Using the first nine months of the 1966 fiscal year as an example, this illustration shows how Northrop's sales dollar is disbursed. Largest portion is paid to employees in salaries and benefits.

## PAYOFF IN ALABAMA



First employee Suggestion Award presented at Northrop Space Laboratories—Huntsville goes to Mrs. Polly Solomon. Making presentation is J. A. Barclay, Huntsville manager.



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

**For Sale**

**Television**, 21" General Electric console, swivel base, remote control, blonde cabinet, \$50. Torrance, DA 6-5566. A

**Baby Crib**, deluxe Edison birch w/Kantwet mattress, \$20. Torrance, 323-8089. A

**Telescope**, 3" Tasco refractor, equatorial, manual slo. motions, 5 oculars, barlow, sun fil., ext. tripod. storage case, \$100. Torrance, 378-7478. A

**Bicycle**, Schwinn Varsity Derailleur, 2 yrs. old, cost over \$85, \$45. Gardena, 329-4387. A

**Bedroom Furniture**, child's, bedframe & headboard, white, \$10. Other items var. prices. Hawthorne, OS 5-7965. A

**Play pen**, training chair, \$10. Hawthorne, 675-6020. A

**Trailer**, 2-wheel box-type, inside dim. 45" x 7'10" x 27", spare wheel & tire, lights, springs, fender & cannon plug disconnect, tie down inside, \$75. Hawthorne, OS 9-8644. A

**Broiler/Rotisserie**, Farberware open hearth, elec., smokeless, spatterfree, \$25. San Pedro, TE 3-9430. A

**Radial Arm Saw**, 10", blades, stand, casters, wire brushes, chuck, \$145. Torrance, 376-4771. A

**Plymouth wagon**, 1959, 6-cyl., r/h, auto. trans., good tires, \$400. Gardena, DA 4-0649. A

**Oldsmobile Cutlass**, 1962, r/h, w/s/w, p/s, 2-dr., orig. owner, \$1125. Torrance, 325-0816. A

**Golf Clubs**, Spalding, set of 3 woods, Bob-bby Jones pinsplitters, 6 mos. old, \$40. Valinda, 330-8777. A

**Rambler Wagon**, 1960, new paint, brakes, clutch, \$350. Yorba Linda, 528-0884. A

**Dog House**, peaked roof, 36" x 43" x 44" high, finished, \$15. Garden Grove, 714-892-5450. A

**Pickup**, 1/2-ton, Ford, r/h, sleeper camper, cabinets, water tank, \$1175. Long Bch., 714-336-5119. A

**Freezer**, 22 cu. ft. chest-type, \$50. Redondo Bch., 376-2068. A

**T-Bird**, 1956, h/top, silver gray, fresh o/haul, paint & tires, auto. trans., orig. owner, \$1275. Pacific Palisades, 454-2057. A

**Home**, new, 3-bdrm. & den, 2 baths, bitin range, dishwasher, disp., thermo, heat control, \$2000 dn., Simi Valley, \$22,000. Redondo Bch., FR 8-3809. A

**Pontiac**, 1959 station wagon, Safari, p/s, auto. trans., air cond., \$625. Beverly Hills, CR 6-3534. A

**Chevrolet**, 1957, 4-dr. V-8 standard trans., glass paks, r/h, \$275. Torrance, 375-0165. A

**Train**, 3/16" American Flyer, 2 locos., 4-pass., 53 pcs. track, 5' x 9' plywood table top, other access., \$30. Fullerton, 714-871-4775. A

**Sailboat**, 14' Sunfish, lanteen rig, nylon sail, Mastercraft trailer, alum. mast, re-finished, \$375. Anaheim, 714-772-3847. A

**Studebaker**, 1957, h/top, Golden Hawk, r/h, p/s, auto. trans., 289 c.i.d. V-8 w/variable speed McCullough supercharger, \$395. Redondo Bch., FR 5-5838. A

**Master Bedroom Set**, walnut, modern, 4 pcs., \$125. Redondo Bch., 672-7424. A

**Ski Boat**, 18' Mahdella, fiber glassed wood hull, 265 cu. in. Chev. eng., 10 hrs., water cooled V-drive, auto. trans., lge. wheel steel trailer, \$2000. Gardena, OS 9-6222, OS 6-8296. A

**House**, 4-bdrm., 2-story, 2250 sq. ft., fire-place, lge. patio, landscaped, fences, sprinklers, insulated, 1 1/2 yrs. old, \$30,000. Compton, 632-4978. A

**Tent**, 9 x 9 umbrella, \$11. Torrance, FR 1-5072. A

**House Trailer**, 38' x 8', fully furnished, new \$200 awning, \$1600. Pasadena, 795-5609. A

**Trailer**, Terry 21', 1964, sleeps 5, butane stove & heat, elec. refrig. & water heater, bathrm. w/shower, 20-gal. pressure water tank, \$2200. Norwalk, UN 3-7548. A

**Cadillac**, 1964, sedan DeVille, air cond., all power, 1-owner, low mileage, \$3750. Inglewood, OR 1-7319. A

**Land**, Antelope Valley, Hi Vista, 10 acres, \$330 terms; \$285 acre. Los Alamitos, GE 1-7056. A

**House Trailer**, 18', sleeps 4, stove, refrig., cooler, shower, \$1295. Redondo Bch., FR 8-2609. A

**Cadillac**, 1965, 4-dr., p/windows, p/s, p/b, air cond., 10 mos. old, \$4740. Orange, KE 2-5938. A

**Hodaka 90cc**, 1965, access., \$350. Lomita, 325-3376. A

**House**, 2-bdrm., 2 blocks from Northrop, zoned for apartments, 10% dn., \$16,500. L.A., 754-4098. A

**Honda 55**, 1963, trail & hwy. bike, compl. w/extras, auto carrier bar, less than 1000 miles, extra tire, \$250. Torrance, FA 8-5931. A

**Home**, 2100 sq. ft., 4-bdrm., family rm., 3 baths, used-brick fireplace, bitins, land-scaped w/sprinkler sys., on 1/3 acre lot, in E. Anaheim, \$29,900. Anaheim, PR 4-7084. A

**Chevrolet Impala**, 1960, V-8, low mileage, \$850. Santa Monica, 399-7648. A

**Porsche**, 1959, convt. D-1600, new paint & top, Michelin X tires, Blau Punkt radio, 2 speakers, tonneau cover, \$1650. Torrance, 370-2048. A

**For Sale**

**Pontiac Le Mans**, 1963, Sports Coupe V-8, auto. trans., p/s, b/seats, low mileage, new tires, \$1450. Culver City, EX 7-8681. A

**Tropical Fish Aquarium**, 25-gal. display-type, heater, miracle & charcoal filters, pemoc pump, rocks, 24 assorted fish & many extras, \$50. Gardena, 323-3796. A

**Chrysler 8 cpe.**, 1931, eng. rebuilt, body needs work & some parts, \$400. Palmdale, 805-947-5555. A

**Mobile Home**, 35' Rollaway w/8'x15' Calif. cabana, knotty pine int., redwood storage rm., new furniture, 2 blocks from Northrop, \$2995. Hawthorne, OS 5-8207. A

**Pickup**, 1963 Chevrolet, 1/2-ton, V-8, column shift, r/h, fleetsides, short bed, overloads, low mileage, \$1200. Lawndale, 370-5056. A

**Alfa Romeo Spyder 2600**, 1964, disc brakes, 5 forward, reclining seats, tools, \$2895. Lynwood, 635-3784. A

**Motor Bike**, 3-wheel, factory made, 2-spd. clutch, \$65. Redondo Bch., FR 5-0747. A

**Stereo Tuner & Amp.**, Scott, Jensen speakers, \$225. L.A., PL 7-7911. A

**Karmann Ghia**, 1959, good mechanically, \$950. Hawthorne, 532-4227. A

**House**, 3-bdrm., paneled den, lge. all-elec. kitchen, patio, block wall fencing, 4-3/4% loan or refinance, \$21,750. La Mirada, 944-1734. A

**Volkswagen Bus**, 1964, 1500 engine, \$1500. Anaheim, 847-4862, 535-2008. A

**Pup**, fox terrier & wire-haired mix, 8 wks. old, \$2.50. Lawndale, FR 0-9440. A

**Refrigerator**, Crosley Shelvador, white, \$50. Torrance, DA 3-8797. A

**Parts** for 1964-65 Chevelle, 4-56-1 rims & pinion, \$40. So. Pasadena, 799-1385. A

**Ford station wagon**, 1957, good condition, \$250. Torrance, 379-7165. A

**Chevrolet Impala**, 1958, sport coupe, special int., chrome wheels, 348 cu. in. V-8 w/Turboglide, many extras, \$875. Lynwood, 632-2642. A

**House**, ocean view, 2-bdrm., patio, \$21,000. Hermosa Bch., 374-8885. A

**Chevrolet**, 1958, convt., 348 cu. in. eng., auto. trans., p/s, p/b, positraction, radio w/rear speaker, heater, w/w, excel. top, \$500. Compton, NE 9-3825. A

**Ping Pong Table**, 1-pc. top regulation size, incls. 4 paddles, \$20. Hawthorne, 676-6021. A

**Apt Bldg.**, 9 deluxe units, 3-bdrm. owner's unit, bitins, \$12,500 yearly gross, N. Inglewood, \$105,000. Torrance, 325-9832. A

**Mustang**, 1965, 289, 4-spd., tinted windshield, \$500 & take over \$66 mo. pymts. \$1750 approx. bal. Cypress, 827-7189. A

**Rings**, man's & lady's matching bands, white gold, florentine finish, \$50. Box 1001. A

**Console Hi-Fi**, radio-phonograph, \$60. Hawthorne, 676-0418. A

**Ford Coupe**, 1948, 1963 Chevy eng., new int., orig. paint, \$1000. Torrance, FR 8-1350. A

**Appaloosa gelding**, 5 yrs. old, gentle, \$300. Rolling Hills Ests., 673-1097. A

**Volkswagen**, 1965, radio, shoulder belts, sunroof, sedan, \$1550. Torrance, 371-9730. A

**Stereo Speakers** & cabinets, 5 mos. old, 10" high frequency flex edge Woofer, cam-bric suspension, 3" wide dispersion tweeter coupled w/an adjust. high pass filter, 3/4" plywood walnut stain, \$75. Wilmington, TE 5-9070. A

**House**, 3-bdrm., 2 baths, den & fireplace, near schools & shopping, \$26,500. Torrance, 375-6071. A

**Beverage Dispenser**, Fountainette, used once, \$150. Torrance, 835-5708. A

**Lamp**, pull down-type, wall mounting, black, \$4. Hawthorne, 676-0758. A

**Tires**, 2, Jeep, genuine, std. size, 1 new, 1 slightly used, \$50. Torrance, 321-0020. A

**Pontiac**, 1951, 6-cyl., std. trans., 4-dr. sedan, 1-owner, r/h, 36,000 act. miles, near new tires, \$300. Hawthorne, 644-1785. A

**Chevrolet**, 2-dr., 1955, h/top, good eng. & trans., needs body work, \$75. L.A., PL 5-1949. A

**Falcon**, 1960, auto., 4-dr. sedan, r/h, \$450. Inglewood, 679-7043. A

**Washer**, Easy, Model WA 222, white, never used, \$200. Manhattan Bch., 788-7519. A

**Tonneau Cover** for 1957 T-Bird, \$30. Wood-land Hills, 348-2441. A

**Pin Ball Machine**, regulation-type, w/bot-tom flippers, all auto., \$75. Torrance, 375-6467. A

**Range**, Gaffers & Sattler, model #3000, white, used 3 times, \$125. Torrance, 327-9003. A

**Ford**, 1958, V-8, sedan, 4-dr., \$175. Haw-thorne, 679-6581. A

**Rambler 400**, 1962, station wagon, r/h, auto. trans., w/s/w, b/seats, 43,000 miles, \$900. DA 9-9464, DA 7-8994. A

**Wheelchair**, E-J hvy. duty, \$50. Northridge, 349-5281. A

**Chevrolet**, 1959, Bel Aire, 2-dr., radio, \$450. Inglewood, 674-1847. A

**Washer**, Frigidaire, auto., \$25. Torrance, 834-7595 10 a.m.-3 p.m. A

**Mini Bike**, 2 1/4 hp Tecumseh eng., head & taillights incld., 1-yr-old, orig. cost, \$160, \$100. Fullerton, LA 6-6759. A

**For Sale**

**House**, 3-bdrm., lge. den & gar., patio, playard, newly decorated interior, near fwy. & schools, 8 min. to Norair, good financing, \$22,750. Gardena, 329-2904. A

**Chevrolet**, Nomad, 1959 station wagon, auto. trans., r/h, p/s, V-8, \$650. Gardena, FA 1-0914. A

**Dishwasher**, portable, Lady Kenmore, used 1 yr., \$100. P.V. Ests., 377-8572. A

**Accordion**, 120-bass, La Scala, model 7432 TD, cost \$485, \$350. 836-4934, UP 1-0999. A

**Boat**, 16', w/trailer & 75 hp Scott out-board, \$1200. Inglewood, 677-6498. A

**American Rambler**, 1962, 2-dr. sedan, r/h, new w/s/w, low mileage, \$500. Inglewood, 674-5445. A

**Icebox**, factory built for camper coach, holds 25-lb. ice block, \$18. Anaheim, 714-776-3939. A

**Piano**, upright, Shoninger, \$150. Fullerton, 714-528-8582. A

**Duplex**, 1-bdrm. ea., R-3 zone, in So. Gate, \$17,500. Los Nietos, 695-7497. A

**Bureau**, maple finish, step up top, front louver doors covering shelf & drwrs., used few months, \$175. Redondo Bch., FR 6-6415. A

**Camera**, Nikon, never used, incl. wide angle lense & telephoto lense, 35 auto., \$120. Box 1002. A

**Coffee Table**, 4', round, red leatherette, glass top, \$25. Rolling Hills, 831-9707. A

**MGA Roadster**, 1962, 1600 Mark II, r/h, \$1200. Port. Bend, 377-8444. A

**Pictures**, Western Ghost Town original drawings, framed, \$5 ea. P. V. Pen., FR 8-1863. A

**Home**, 3-bdrm., family rm., breakfast bar, 2 baths, patio, fenced yd., bitins, 4 yrs. old, near high school in Sun Ray area, w/ GI loan, \$1000 dn., \$22,750. Rolling Hills Ests., 375-8778. A

**Acreeage**, near Rosamond in Antelope Valley, East Kern water distr., 10 acres, \$595 acre. Torrance, FR 8-1026. A

**Ford Falcon**, 1960, \$135. Torrance, 370-1788. A

**Porsche Wheels**, 4 16", w/turbo-disc caps & 4 Butyl tubes & 3 used Dunlop tires, \$20. Woodland Hills, 346-6675. A

**Wet Suit**, skin diving or surfing, for man about 6', 180 lbs., \$5. Manhattan Bch., 374-2006. A

**Breakfast Bar stools**, 4 w/wicker backs & seats, black steel frame, \$7.50 ea. Lawndale, PL 4-1215. A

**Motorcycle**, Yamaha Trail 55, 55 c.c. w/road & trail gear, 12V bat-gen. w/elec. start, book rack & skid plate, \$125. Inglewood, 674-3083. A

**Chevrolet Biscayne**, 1961, auto. trans., 6-cyl., r/h, \$550. Inglewood, 678-1621. A

**Rollaway Bed**, \$7. Hollydale, ME 3-2395. A

**Dog**, German shepherd male, 1 yr. old, good w/children, \$25. Torrance, 370-4947. A

**Austin Healey**, 3000 MK III, 1964, wood dash, wire wheels, 4-spd., o.d., new tires, mufflers, \$2400. Redondo Bch., 379-7567. A

**Headboard**, chartreuse & gold, frame for dble. bed, \$12. Torrance, 326-0513. A

**Chevrolet**, 1956, station wagon, \$125. W.L.A., 391-7781. A

**Ford Galaxie 500**, 1965, 2-dr. sedan, V-8, r/h, p/s, factory air, 14,000 miles, \$2495. Long Bch., 423-1363. A

**Furniture**, 2-tier end table, coffee table, lamp, small table, mag. rack, bar stool, 5' rm. divider, all birch or Salem maple, orig. cost \$475, all or part, \$275. Long Bch., 433-0861. A

**House**, 3-bdrm., all extras, recently redeco-rated, 25-minute freeway drive to Norair, terms, \$33,000. San Pedro, TE 3-9264. A

**Lot**, 80' x 100', at Snow Summit Ests., Big Bear Lake, 1 block from inn & ski area, financing available, \$6950. Fullerton, 525-1677. A

**Ford**, 1960 V-8, 4-dr. sedan, Fordomatic trans., r/h, good tires, new voltage reg. & gen., \$400. Torrance, 329-2521. A

**House**, 2-bdrm., in Westchester, lge. lot, dble. gar., near schools, shopping, 5 1/4% FHA loan, low dn., \$23,650. L.A., 645-5169. A

**Cadillac Hearse**, 1955, new factory-installed eng., trans., paint, 6-ply w/w tires, \$875. Northridge, 349-2021. A

**Camper**, 8', Alaskan, gas refrig., stove, \$750. P.V. Ests., FR 5-2775. A

**Radio**, Zenith, table model, AM & FM, w/AFC, \$30. Torrance, FR 1-1096. A

**Volvo**, PV 444, 1958, eng. good condition, \$175. Inglewood, 674-1885. A

**House**, in Victoria Knolls, 3-bdrm., 2-bath, lge. covered patio, bitin stove, 5 1/4% mortgage for \$18,400, \$27,500. Torrance, 325-0039. A

**Utility Trailer**, 3 1/2' x 7 1/2', bed, wood & steel structure, \$35. Huntington Bch., 842-2649. A

**House**, 4-bdrm., 2 baths, family rm., bitins, fully landscaped, 5% down, \$23,975. Thousand Oaks, 805-495-7927. A

**Washing Machine**, Hotpoint, needs water valve, \$10. Redondo Bch., 372-8502. A

**Trailer**, 1-wheel, spare tire & tube, \$50. Los Alamitos, GE 1-0843. A

**House**, 2-bdrm., fireplace, w/w carpet, drapes, dble. garage, \$20,950. Inglewood, OR 1-3860. A

**For Sale**

**Poodle**, female, spayed, black miniature, 1 yr. old, papers, \$40. Redondo Bch., 370-0157. A

**Home**, 4-bdrm., 1700 sq. ft., 2 baths, lge. kitchen, new dishwasher, walnut-paneled family rm. w/fireplace, \$29,950. Torrance, 371-9775. A

**Range**, O'Keefe & Merritt, chrome top, grid-dle, broiler, \$35. Redondo Bch., 370-7967. A

**House**, 2-bdrm., lge. R-2 lot, 160' deep, rm. for bldg., paneled living room, 5 min. from Northrop, \$17,500. Lennox, 671-1089. A

**Corvaire Monza**, 1961, 4-dr., 61/62 eng., good t/b, r/h, \$495. Torrance, FR 5-4987. A

**Chevrolet**, 1955 station wagon, engine needs work, \$50. La Crescenta, 249-9387. A

**Corvette**, 1965, hard & soft tops, 365 hp eng., 4-spd., posi-trac., p/wind., \$300 dn., take over \$100 mo. pymts. L.A., 387-1593. A

**Wanted to Buy**

**Avanti**, 1963, good condition. Hawthorne, 644-1958. B

**Utility Trailer**, lge. U-haul type, either open or covered, with or w/o hvy. duty hitch., consider suitable vacation trailer shell. Hermosa Bch., 374-5425. B

**Chevrolet**, 6-cyl., 4-dr. stand. shift, w/eng. in good mech. cond. L.A., 384-7950. B

**Encyclopedia Britannica** or Americana published after 1958 w/year books. Westminster, 714-892-5801. B

**Want to buy** evaporator-type cooler for house trailer. Gardena, 635-3127. B

**Adding Machine**, elec., in good condition. Manhattan Bch., 376-4787. B

**Automobile**, low mileage, any year. Inglewood, OR 2-4486. B

**FREE (To Be Given Away)**

**Kittens**, 8, yellow, blue eyes, 6 wks. old. Redondo Bch., 372-8334. D

**Dog**, miniature collie, male. Manhattan Bch., FR 6-9964. D

**Rentals Offered**

**Vacation Cabins**, Idylwild, secluded, creek, patios, \$20 weekend, \$50 wk. & up. L.A., PL 4-5288. E

**House**, 2-bdrm., furn., dble. gar., 4 blocks from beach, \$135 mo. Gardena, DA 4-7688. E

**House**, 2-bdrm., unfurn., stove & refrig., children OK, avail. June 20, \$125 mo. Hawthorne, 595-3013, 675-3901. E

**Bachelor Apt**, 1-bdrm., furn., fenced yd. & patio, within walking distance of Norair, \$85. Manhattan Bch., FR 6-2122. E

**Apt**, 2-bdrm., parking space, children OK, no pets, \$100 mo. L.A., 670-4473. E

**Home**, exec.-type, 3-bdrm. & den, 2200 sq. ft., family rm. & kitchen, 2 baths, sep. dining rm., bitins, 2 1/2-car gar., in Lawndale, \$275 mo. Torrance, SP 2-5628. E

**House**, 3-bdrm., 1 1/4 bath, newly decorated, near La Mirada shopping center, \$155 mo. Torrance, FR 1-1308. E

**Studio Apt**, 3-bdrm., 2-bath, unfurn., pvt. patio, closed gar., hobby shop, trash & hot water pd., children accepted, \$165 mo. Torrance, FR 5-0867. E

**Apt**, 3-bdrm., 2 baths, vicinity Pico & La Cienega, \$175 mo. L.A., WE 5-4006, WE 5-9148. E

**Apt**, unfurn., 1-bdrm., bitins, including refrig., laundry facilities, gar., 15 minutes to Northrop, adults, \$90. Redondo Bch., 379-0979. E

**Apt**, deluxe, 3-bdrm., 2 baths, family rm., fireplace, pvt. patio, bitin units, intercom, dishwasher, f.a. heat, hot water & trash pd., near Norair, \$175. Hawthorne, 679-1358. E

**House**, 2-bdrm., fenced yd., trash & water pd., no pets, \$105 mo. Lawndale, 371-6775. E

**Vacation Cabins**, Lake Gregory & Crestline, make reservations early for May thru Sept., \$25 weekends, \$60 wk. Venice, EX 1-2040. E

**Apt**, 2 & 3-bdrm., furn., lge. rooms & closets, only 4 short blocks to Northrop, all utilities pd., \$125 & \$155 mo. San Pedro, TE 3-2512. E

**House**, 3-bdrm., 1 1/2 bath, 2-car gar., 1 mile from beach, rent or lease, \$175 mo. Hollywood Riviera, FR 5-9676. E

**Child Care Wanted**

**Need to live in** & care for 4 school age children during summer, June 1 to Sept. 1, dependable, mature. Orange, 633-4378. H

**Personals**

**Ironing**, my home, \$10 a piece, \$15 dresses. Inglewood, 671-2584. L

**We wish** to express our sincere thanks to our Nortronics friends for their kindness & sympathy at the recent death of our father. KIT & JILL KITTO. L

**We would** like to express to all concerned our sincere thanks for the beautiful flowers & expressions of sympathy at the death of your co-worker, Harold E. McDonald. THE McDONALD FAMILY. L

**Flight Safety** engineer wants to exchange maintenance work on light aircraft for flight time. F.A.A. licensed A & P mechanic. Hawthorne, 644-2592. L

**Instr. Pilot** flying Bonanza to East Coast June 8-15, need passengers to share expenses, \$140 ea. rd. trip. Hawthorne, 379-7563. L

**Personals**

**To** all my many wonderful friends throughout Nortronics, I want to thank you for the donation to The City of Hope & for your sympathy & kindness shown me at the loss of my mother. RUTH FORSTROM. L

**Housekeeper wanted**, for elderly couple, live in, 3-bdrm. home, light housework, must be able to drive, \$200 mo., 5-day week. Inglewood, 673-1133. L

**For Sale or Trade**

**Ford XL**, 1964, h/top, b/seats, air cond., p/s, Vibra-sonic radio, \$2000 or trade for late model pickup truck. Torrance, 323-9571. M

**Sailboat**, 16' Skimmer class, many extras, new dacrons, trailer, \$650 or trade for small sedan or sports car. Garden Grove, 714-539-2098. M

**Tires**, Michelin X, 4, almost new, 6.40 x 13, w/tubes, \$100 or trade for 4 good tires any make & \$75, avail. about June 1. Huntington Bch., 714-847-2648. M

**MG-TF 1500**, new top, Pirelli tires, wire wheels, wood & chrome steering wheel, transistor radio, rebt. eng., \$1200 or consider trade on Mustang, Austin Healey, MGB or Jaguar XKE. L.A., 657-3074. M

**Comet**, 1962, 2-dr. 6-pass. custom sedan, \$750 or trade for late model station wagon. Buena Pk., 527-1201. M

**Going my way?**

**Rides Wanted**

**8 a.m. — 4:45 p.m.**

**Hawthorne & Hwy. 101**, Torrance. Sandy Parmdee, Nortronics, ext. 387, 375-2018. 5

**Topanga & Van Owen**, Canoga Park. Stanley J. Ehlinger, Nortronics, exts. 461, 462, DI 8-3289. 5

**Lincoln & Knott**, Anaheim. Interested in starting 2-man car pool, own sports car. A. Wood Rigsby, Norair, ext. 4757, 714-527-8515. 5

**Crenshaw & Century**, Inglewood. Marjorie A. Nelson, Nortronics, exts. 563-564, 671-6732. 5

**Orange Ave. & Del Amo Blvd.**, Long Beach. W. H. Covert, NSL, ext. 2721, 423-1363. 5

**La Brea & Jefferson**, L.A. Howard Kornblue, Norair, ext. 2024, WE 9-3519. 5

**Rides Offered**

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**Lincoln & Knott**, Anaheim. Interested in starting 2-man car pool, own sports car. A. Wood Rigsby, Norair, ext. 4757, 714-527-8515. 15

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**Orange Ave. & Del Amo Blvd.**, Long Beach. W. H. Covert, NSL, ext. 2721, 423-1363. 15

**La Brea & Jefferson**, L.A. Howard Kornblue, Norair, ext. 2024, WE 9-3519. 15

Real Estate Talks Draw High Praise

Enthusiasm ran high among the 100 Northrop people who turned out for the initial session in a series of real estate investment lectures sponsored by Northrop Recreation Club last week.

The series will continue meeting each Tuesday (5 to 7 p.m.) at NRC Clubhouse, Hawthorne, for at least eight more weeks.

Employees and their families may enroll at any time. The cost is \$10 per person or \$15 for husband and wife.

Taught by leading experts in the investment field, the series is tailored to the individual with information on all types of property investments, hints and suggestions, pitfalls and promising areas, plus general information such as legal and financial arrangements.

Those taking part in the first lecture offered such comments as "ideal, just what I wanted," "the answers I have been seeking," and "the finest coverage of a topic I have ever heard."

Three-Day Weekend

All Northrop Corporation personnel will observe a holiday Monday, May 30, in honor of Memorial Day. Only those employees notified in advance will be required to work.



## Search Is On For People 'Just Like You'

Northrop Nortronics needs people — preferably just like you . . .

Which is one way of saying an intensive search is currently in progress to locate and employ other individuals with the skills, dedication and pride of accomplishment which have become Nortronics trademarks, thanks to our present personnel.

Those sought will fill long-term job openings that have reached a peak, both in scope and numbers, unequaled in recent years at west coast facilities.

For instance, skills required cover a broad spectrum from machinist to scientist, from tooling to research.

New contracts in several fields, plus accelerated activities in older fields, have created these opportunities.

At Nortronics Anaheim there are job opportunities for 30 to 40 machinists of many types, for prototype shop personnel and tooling specialists.

In technical fields at the same location there are pressing needs for graduate engineers to work in ordnance programs, in automation systems, in deep submergence systems, and in tactical reconnaissance and intelligence activities.

At Nortronics Hawthorne, where work is progressing on the C-5A navigation system, there are also many specific requirements for men skilled in digital computer design, navigational systems evaluation and analysis, reliability and other related fields.

Elmer Noonan, Nortronics director of Industrial Relations, points out that Nortronics employees have always been a key source of information in the hiring of new employees and there is a greater need for this type of assistance now.

"We have one of the finest groups of employees found anywhere," Mr. Noonan said. "And these men and women, familiar with our policies, working conditions and benefits have traditionally helped fill our manpower needs by recommending the type of people we seek, individuals they know and want to work with."

Any employee may contact Nortronics Personnel office for more detailed information on current job openings, Mr. Noonan added.



**JUST START, THAT'S ALL**—After lifetime of wanting to take up painting, Sophia Adams of Nortronics Hawthorne walked into store, bought materials and started painting. In just over a year she has done remarkably well, as display above indicates.

## 007 Relegated to Tank Duty, While 011 to Soar in Space

In a complete reversal of recent trends, 007 has been assigned a secondary role.

NASA apparently has little regard for the magic number which, thanks to the late Ian Fleming's James Bond thrillers, now adorns everything from coed sweatshirts to men's toiletries.

The agency has assigned Apollo Spacecraft 007 to water impact and flotation tests in the Gulf of Mexico and in an environmental tank at the Manned Spacecraft Center, Houston.

Meanwhile Spacecraft 011 which contains a command module similar to those in which astronauts will ride in later Apollo flights, is being prepared for launch during the third quarter of this year aboard a two-stage Saturn 1B vehicle.

Both vehicles were delivered recently to NASA by North

American Aviation's Space and Information Systems Division of Downey.

Primary goal of Spacecraft 011's mission will be to gather additional data on the Apollo heat shield to supplement that obtained in the February 26 flight of Spacecraft 009, the first flight-type Apollo launched into space.

While 009 proved the heat shield was adequate under a high heat re-entry velocity (approximately 26,500 feet per second), Spacecraft 011 is scheduled to re-enter the earth's atmosphere on an elongated trajectory to produce a higher, total heat load.

Packing of the Earth Landing System for Spacecraft 011 has recently been completed by a team of Northrop Ventura experts at Cape Kennedy.

This marks the last time, under present plans, that the packing will be performed at the Cape. Apollo parachutes will now be packed at Northrop Ventura's Conejo Valley facility and shipped to nearby Downey for installation on the vehicle. The spacecraft will be ready for launch when it leaves North American.

The new arrangement will result in considerable savings for the Apollo program.

Four other earth landing systems, using the Block I configuration, have been completed and delivered by Northrop Ventura. The Division is presently at work on the first Block II configuration.

## Production Facilities, People on the Move

An extensive rearrangement program involving both facilities and personnel which began at Nortronics Anaheim in early April is currently nearing its mid-point with completion now set for mid-July.

One of the first major moves taken was the reactivation of Building Y-12, a facility formerly devoted exclusively to warehousing and offices. Under present planning it will continue to fill these roles and also provide Nortronics with additional manufacturing space.

For instance, the 100,000-

square-foot Y-12 facility contains 36,000 square feet of office area. The remaining space is available for warehousing and manufacturing. Already in operation there are assembly efforts Nortronics is performing on the F-5 and T-38 programs. And plans call for the assembly of Hawk missile system launchers and loaders being built under a new contract to be centered in Y-12.

Before the end of May, office areas will be in use as headquarters for Nortronics' Field Support, Logistics, Support Services and "TIPI" program personnel.

Already operating out of Y-12 office areas are personnel assigned to the Defense Contract Administration Services office, Vitro and Teague organizations.

A renovation is being carried out in the north end of Building Y-1 to accommodate Northrop Data Processing personnel and equipment. In the same building area modernization work is progressing toward new quarters for the Nortronics Metrology Laboratory, currently in Building Y-2.

Other areas in Y-1 vacated by departing groups are to be utilized for expanding and re-grouping administrative functions.

Building Y-2 is now programmed to become a major production facility devoted to ordnance activities and also the production of missile system components for the Hawk program.

Ordnance Systems personnel currently working in Y-2 are scheduled to be moved into the top floor of Building Y-3, the major office and engineering center. Personnel assigned to Automation Systems will continue to occupy the third floor of the same building, while the second floor will continue to be utilized for various groups including Configuration Management, the library, Deep Submergence Systems Program, blueprint center and Cost Estimating. No changes are currently planned for major administrative offices on the ground floor.

## PPD TO SPONSOR AFCEA CHOICE FOR FELLOWSHIP

Northrop Nortronics Precision Products department at Norwood, Massachusetts, will sponsor one of six high school seniors selected as fellowship winners by the Lexington-Concord Chapter of the Armed Forces Communications and Electronics Association.

The six winners will each work in a different aerospace firm for a 10-week period this summer, receiving paid on-the-job training and observing the inner workings of the electronics industry.

Fellowship winners will be selected from 20 nominees now attending high schools in the vicinity of Hanscom Field, Bedford, Massachusetts, headquarters of the Electronic Systems Division of the Air Force Systems Command.

The announcement was made recently by Colonel Francis J. Dillon Jr., president of the Lexington-Concord AFCEA Chapter, and Lou de Brigard of PPD, Chapter vice president for Education.

Colonel Dillon is director of analysis of the Air Force Electronic Systems Division's Deputy for Advanced Planning.

## Border Site Picked By NRC Rockhounds

Montgomery Pass, just off Highway 6 at the California-Nevada border, will be the destination of Northrop Gem and Mineral Club over the coming long Memorial Day weekend.

Plans call for establishment of a base camp two miles east of the state line. Obsidian is readily available in the immediate area, with geodes and petrified wood nearby.

## COMPUTERS: A Versatility Never Before Obtainable

(Continued from page 1)

sults are obtained at Hawthorne on the 360/65, they will be sent back to their points of origin by the same method. At present this service is being provided using the 7090.

"This technique obviates the need for maintaining elaborate computer complexes at all Northrop locations, and is important to the modern concept of a centralized data processing complex in a large corporation," Mr. Lotz said.

"In fact, by early 1967—less than 12 months away—the smaller computer models at Northrop's outlying sites will be able to process voluminous business and scientific data "on-line" with the

360/65.

"In other words, information which cannot be handled locally will be processed directly to and from Hawthorne, without any intervening steps. What is more, Anaheim or Newbury Park work—for example—may be receiving its solution simultaneously with other work in the computer. This is due to the new multi-programming feature of the 360/65."

The 360/65 will be supported by the two smaller 360/30 systems which are now operational at Hawthorne. This support will be further augmented later this summer with the planned installation of model 30's at Anaheim and Newbury Park. This total

equipment network will afford Northrop with a complete and modern computer capability.

Preparatory to the installation of the new equipment, key computer operators have been engaged in a training program on a five-hour-a-week schedule. At the same time, key NDP business and scientific programmers have been receiving an intensive orientation within the department and at IBM headquarters. Indoctrination courses are also being conducted for other interested computer users throughout the corporation.

"The 360/65 system was selected only after detailed and careful study of Northrop's needs and investigation of the equip-

ment best suited to those needs," said Paul Wierk, head of the Data Processing department and corporate director of Management Information.

"Early in 1965 a corporate task force had begun a review of these two considerations and by August of last year came up with the recommendation for the selection of the 360 system," he added.

"With this third-generation computer, all of us look forward to getting our work done more accurately, faster and with a flexibility not available to us before," Mr. Wierk said. "It comes at a favorable time, paralleling and aiding the growth of other Northrop technologies and achievements."



Pat Richards of Publication Services sits alone in midst of stored office furniture in Nortronics' Anaheim Building Y-12 currently being used in rearrangement program. Offices will soon be occupied.



# NORTHROP NEWS

NORTHROP NORTRONICS

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June 8, 1966

## F-5's Wing 11,200 Miles To Ethiopia

The first Northrop F-5 tactical fighters programmed for Ethiopia were flown recently to that country from California, a distance of 11,200 miles, in the longest F-5 "high flight" deliveries made to date.

Ethiopia became the latest allied nation to obtain an initial quantity of this supersonic fighter, to modernize its air force. F-5's began entering the defense inventories of free world countries in early 1965.

The fighters left McClellan Air Force Base, California, near Sacramento, flew to the U.S. east coast and then crossed the Atlantic via the northern route to their final destination of Harar Meda Air Base, Ethiopia. Crew rest stops were made in Europe, Iran and Saudi Arabia. The F-5's flew at an altitude of 30,000 feet or higher during the flights.

Four of the aircraft, which comprised the first of two delivery elements, participated in fly-by ceremonies shortly after arrival, celebrating Ethiopia's National Liberation Day.

Although jet-experienced, a majority of the USAF pilots who delivered the aircraft half way around the world had never before flown the versatile F-5—except for a one-hour familiarization flight in a two-place F-5B shortly before beginning their mission.

This unusually brief checkout was possible due to the F-5's relatively simple operational procedures. Three other USAF pilots also delivered additional F-5's to Norway recently, after similar one-hour orientation flights.

Under new delivery procedures, F-5's for allied nations in Europe, the Middle East and Africa are now flown to destinations. It is estimated that this will save 30 days or more in delivery and flight readiness time requirements.

### LOLA'S LAMENT

## Well, Which Horse Will It Be Today?

Most young ladies who have faced the problem of selecting just the right ensemble will feel sympathy for Lola Davis and her pending problem—which of three horses to ride.

Miss Davis of Nortronics Hawthorne hasn't faced the decision yet. That comes later this summer.

Naturally, Shamrock, a seven-year-old bay mare quarterhorse type, holds certain seniority rights. Shamrock has belonged to Miss Davis since the horse was six months old and over the past two years has been Miss Davis' mount as she won 31 trophies and 56 ribbons in competition.

But a frisky quarterhorse named Flako Boy is now 21 months old and must be broken and trained beginning later this year. Then, there is Tehilaroc, an 11-month-old Appaloosa filly, who will require much attention and season-

## A 'GENERAL' TOUR



Brigadier General Arthur E. Exon, USAF (center), Defense Contract Administration Services Region director, was visitor to Nortronics Anaheim recently for orientation tour. His hosts were Frank Lynch, Nortronics vice president and manager of Operations (right), and Commander W. D.

Buckbee, DCASO chief at Nortronics (facing camera). At left is Commander M. H. Thompson, DCASO chief at Anaheim. Others are Nortronics DCASO officials, James Pape and Tom Post.

## ANAHEIM PLANS FALL OPEN HOUSE, FIRST IN 10 YEARS

Sunday, September 11, has been selected as the date for a gala open house to be held at Nortronics Anaheim, it was announced this week by Frank Lynch, Nortronics vice president and manager of Operations.

This event, the first of its type in 10 years, will be staged for Nortronics employees, their families and guests and will allow visitors to tour all areas of the facility. Special invitations are being extended Nortronics personnel working at other facilities to take part, Mr. Lynch said.

### \$49 BILLION INVESTED

Tens of millions of Americans own United States Savings Bonds. The value of Series E and H Bonds outstanding is now 49 billion dollars.

## Changes, Additions Made In DSSP Organization

Northrop Nortronics recently completed a general rearrangement of functions within its Deep Submergence Systems Program (DSSP) organization.

A. E. Krapf, DSSP program manager, indicated the changes involved, basically, the redesignation of two major activities and the creation of a third, a new function within DSSP.

"Our experiences in carrying out our DSSP responsibilities have indicated the streamlining of certain functions along set lines is in the best interest of the program," Mr. Krapf said. "Changes made will enable us to afford maximum response to special requirements in many areas."

The DSSP Washington, D.C.

resident staff has been redesignated the Engineering Systems Integration unit. Named to supervise this activity is J. W. Jenkins, a member of the Nortronics Washington organization since last October. He is responsible for a resident group of seven specialists, plus others assigned to this organization as requirements dictate.

The former DSSP Engineering unit at Anaheim has been redesignated the Systems Engineering and Test unit and continues to operate under the supervision of G. G. Duke.

The new function is known as the Systems Analysis unit and is headed by Dr. O. H. Griffith, acting supervisor, who recently joined the DSSP organization.

Nortronics serves as the systems engineering support contractor for the U.S. Navy for the over-all DSSP effort, an extensive underwater research and development program.

The DSSP effort is a five-year, multimillion dollar project aimed at improving navy capabilities in four major and basic undersea operations: location and recovery of survivors of submarine disasters; development of underwater bases where divers may live and work; recovery of large ships sunk below the surface of the ocean; and the development of a submersible, manned vehicle which could recover small objects and conduct oceanographic investigations to depths of 20,000 feet.

Nortronics carries out its key role in the program by working closely with the U.S. Navy Deep Submergence Systems Project office under the chief of Naval Material.

## Contract Won For Tactical Info System

Northrop Nortronics has received a \$4.1 million contract to help the armed services develop a system to provide military commanders faster and better battlefield information.

Northrop will provide systems engineering and technical direction for a new joint service program known as TIPI (Tactical Information Processing and Interpretation). The TIPI program is a joint effort of all U.S. military services to develop field intelligence processing units required to keep pace with modern aerial and surface reconnaissance equipment.

The high speed information processing centers, contained in mobile units, will be available for rapid transport to any location in the world in response to tactical warfare requirements, ranging from operations such as those in Vietnam to major conflicts.

Scope of the program, which is under the direction of the TIPI Joint Service Program Office at Wright-Patterson Air Force Base, Ohio, encompasses design, development and acquisition of facilities. Northrop will participate in all phases of the program.

Numerous firms are expected to participate in the TIPI program because of the wide range of technologies required by the mobile intelligence facilities. Included are photo processing, photographic reproduction, electro-optics, electronics, data processing and information displays.

## Twenty Receive Service Emblems

Twenty Northrop Nortronics employees assigned to west coast operations received either 10 or 15-year Northrop service emblems during May.

Eligible for 15-year service pins were Emzley Clancy, Sarah Jackson, Reymundo Martinez, William Mock, Ruth Hartman, Joseph Wilson, Myron Long jr. and Frank Stetson.

Ten-year awards went to Vera Hildebrand, Evelyn Galante, Bernard Shay, Frank Meers, Marjorie Phillips, Deo Terry, Robert Kalthoff, George Davis jr., Donald Kreuziger, Robert Russell, Bob Huffman and Isamu Murakami.

## Anaheim Considering New Bowlers Clinic

The possibility of sponsoring a bowling clinic to teach beginners the art of the game and to help regulars correct faults is being studied by NRC at Nortronics Anaheim.

Such a clinic would be held at 6 p.m. on Monday at Carter Bowl, Fullerton, Commissioner Chet Guzinski reports.

ing in due time. "I spend about four hours on weekdays and eight hours on Sat-



Miss Davis and trophies.

urday and Sunday at the stable working with all three," Miss Davis said. "I guess I will just have to split my time up even more when I begin to ride all three. It will be a hard decision to make."

Miss Davis never outgrew a love of horses that began when she rented horses as a youngster at riding stables. She began riding regularly in California about five years ago and has entered competitive events for over two years.

One of the highlights was being named women's champion of the 1966 Winter Circuit at South Bay Riding Academy. The award was based on points garnered during six major events held since late 1965.

"I ride in the gymkhana, barrel racing, pole bending, keyhole, figure 8 and rescue races," Miss (See RIDER, page 6)



## CASA PIONEERS IN EUROPE

## Automated Data Control in Spain

Construcciones Aeronauticas, S.A. (CASA) of Spain has taken initial steps involved in the implementation of one of the most advanced Automated Production Control systems of its type in Western Europe.

This system, utilizing an IBM electronic computer and advanced peripheral equipment, will be utilized for high-speed document preparation and source data collection.

CASA, one of Europe's leading aerospace firms, and Northrop Corporation are cooperating in a production program to supply 70 Northrop F-5 fighters to the Spanish Ministry of Air. Most of the production will center at CASA facilities at Getafe and Seville.

This completely integrated Automated Production Control System will be used for such business functions as preparation of a master product de-

finition file, preparation of a master schedule file, production order release, production control, material requisitioning, purchase order and receiving control, inventory control, material requirements analysis and cost control.

Following acceptance of the system, a program to select, train and establish a computer systems and programming staff was instituted. Ten CASA tech-

nicians are currently attending special courses on computer programming.

A second major step is the acquisition of new equipment. Toward this end an extensive final equipment evaluation program is in progress.

Mike Nolan, a member of the Northrop team in Spain, has worked extensively in the initial planning for the system.

Coordinating over-all efforts in the planning between Northrop and CASA organizations on data processing activities has fallen to Tak Yamashita, director of Programming for Northrop Data Processing.

"CASA recently requested further assistance in this program in the form of an experienced programmer to work in Spain for the remainder of this year," Mr. Yamashita said.

For this assignment Mr. Yamashita has selected Jesus Noguera, an experienced Northrop Data Processing programmer. Mr. Noguera is a native of Spain and former student at the University of Madrid as well as an electrical engineering graduate of Northrop Institute of Technology.

Mr. Noguera will report to CASA approximately July 1.

"Mike Nolan has done a very good job in helping plan for this system," Mr. Yamashita added. "And the Northrop-CASA working relationship, as exemplified in this new system, has been a harmonious and rewarding one."

## Federal Program Trainees Visit Northrop Ventura

Twenty-five machinist trainees toured manufacturing facilities at Northrop Ventura last week as part of the federal Management Development Training Act.

The trainees, who meet in class regularly at Ventura Union High School, were shown the operation of mills, lathes, turret lathes, shapers, profilers and other machine shop equipment.

Accompanying them were Al Robinson, former machine shop supervisor at Northrop Ventura, now an MDTA instructor, and Walt Zorovich, supervisor of the local MDTA program.

Johnnie Via, NV personnel representative, arranged the evening tour, which also included the showing of a movie on Northrop Ventura's part in aerospace recovery systems.

## Floating Holidays Assigned for 1966

Northrop Corporation's two floating holidays for 1966 have been assigned.

One will be Friday, November 25, which means a four-day holiday in conjunction with Thanksgiving Day, a regular holiday.

The second floating holiday will be taken December 26. Which means the yearend holiday will begin with the conclusion of work shifts December 23 and continue until January 3, a Tuesday.



Dr. Theodore Bullockus has been named associate director of Northrop's Organization for Development Assistance Programs (ORDAP). Dr. Bullockus formerly was chief of economic analysis at Douglas Aircraft Company, Santa Monica. ORDAP, headquartered in Beverly Hills, is headed by James L. Taylor and provides contract services in development research, planning and program support to free-world nations. Dr. Bullockus will be primarily responsible for investigation of potential ORDAP programs in Africa.

## National Committee Names Roland Scott

Roland B. Scott, Northrop Norair Community Relations coordinator, has been appointed to a second three-year term as a member of the President's Committee on Employment of the Handicapped.

This committee is composed of representatives of labor, industry, business, civic veterans and fraternal organizations who promote the hiring of handicapped individuals. It was founded in 1947.

## DEEP SEA QUEST, SST ON AEROSPACE TELEVISION SERIES

Latest developments in aerospace technology will be explored throughout the month in a series of hour-long television programs on KCET, Channel 28.

At 7 p.m., Friday, Dr. Martin Klein, moderator, will present films on deep-diving submarines.

At 9:30 p.m., June 14 and again at 7 p.m., June 17, the topic will be "Deep Quest and Deep Submergence Rescue Vehicle."

"Microelectronics," and the methods used in developing them, will be the subject on June 21 at 9:30 p.m., to be repeated at 7 p.m., June 24.

The supersonic transport plane, Concorde SST, being built jointly by a French and a British company, will be reviewed at 9:30 p.m., June 28 and again at 7 p.m., July 1.

Previous programs which have been of interest to Northrop personnel have covered lifting bodies, such as Northrop's M2-F2 and HL-10, and the Gemini and Apollo projects, in which Northrop plays a major part.

## Dance Class to Open

A new series of ballroom dance lessons open to all Northrop families begins June 16 at NRC Clubhouse, Hawthorne, for a 10-week period.

The cost is \$5 per person for each course.

## RELIES ON EXPERIENCE AND INSTINCT

## The Test Pilot: Judge and Juror at the Pressure Point

There is a point—which might well be called a pressure point—when all the efforts involved in the creation of an aircraft system focus on a single factor.

That factor: flight test.

Obviously, a polygenetic array of talents are employed in arriving at this point. They provide detailed engineering, procurement, fabrication, assembly, testing, inspection and verifications. They create, build and check out the system through a long and detailed process. And there always remains a bit of each individual contribution in the total system.

Yet, in the final analysis, as flight test begins, the role of judge and juror rests largely with one man, the test pilot.

His keen sense of judgement must determine how well the system performs its assigned mission. And he can never lose sight of customer requirements in any decision he makes.

To fill such a role requires an unusual type of man.

Northrop Norair has a six-man team of test pilots, plus one demonstration pilot, all reporting to R. M. "Bob" Elder, director of Flight Operations.

They are, in the words of Welko Gasich, Norair's vice president—Technical, "the very best in the industry, outstanding men in every respect."

This team is extremely versatile. Within its ranks are men capable and qualified to fly almost any type of aircraft—fighters, bombers, large transports, helicopters, seaplanes, and even the newer V/TOL types. It is also flexible. While working in specific areas of re-

sponsibility, the pilots often switch jobs to meet special requirements. And they operate all types of aircraft being tested by Northrop today.

In addition to an average of 15 years of flying experience per man, the team is composed entirely of former pilots of military services and has a high complement of men who graduated, often with honors, from military test pilot schools.

Norair test pilots are engineers, many with higher degrees or specialized courses in the physical sciences. And most have worked at one time or another in engineering fields other than flight test.

Mr. Elder, H. E. "Hank" Chouteau, R. G. "Dick" Thomas and W. A. "Bill" Anderson handle a majority of the engineering flight test assignments. John Januleski, supervisor, and Darrell Cornell handle Production Flight Acceptance tasks. C. C. "Casey" Finnegan flies most of the aircraft demonstration

program missions.

"Our pilots are shifted from one assignment to another if and when program requirements make it necessary," Mr. Elder said. "This capability is an important one which enables us to carry out special test programs without delay."

Mr. Elder is a retired U.S. Navy captain, a graduate of the University of Washington, and former skipper of the attack carrier USS Coral Sea. Honor graduate (1952) of the Naval Test Pilot School, Mr. Elder pulled three duty tours in flight test operations at Patuxent River NAS, including one as director of Flight Test. He commanded two fighter squadrons and an air group and helped qualify many of the Navy's fighter aircraft for carrier operations. He served in the Navy 23 years.

Mr. Chouteau is a former Air Force fighter pilot and a graduate of the Air Force Experimental Flight Test Pilot's School. He also holds a degree from the

University of Wyoming. Since 1952 Mr. Chouteau has flown for Northrop, first on the Snark program, then at Edwards Air Force Base since 1956. He flew the initial flight of the YF-5A aircraft in 1963 and has carried out many flight test programs over the years. As chief test pilot, he is responsible to Mr. Elder for the functioning of the test pilot group which includes both engineering and production flight test.

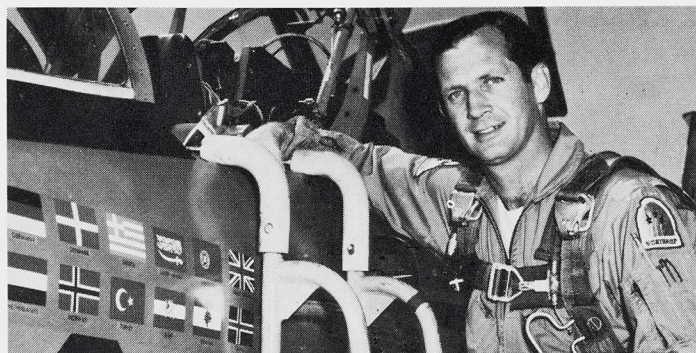
Mr. Januleski is a graduate of the United States Military Academy at West Point and a former Air Force pilot. He began flight work with Northrop by flying F-89's in support of drone aircraft programs and later was assigned to the Production Test facility at Palm-dale. He also serves as an F-5 demonstration pilot in addition to his duties as supervisor of Production Flight Acceptance.

Mr. Thomas began test flying in 1956, first with Beech Aircraft, then

(See TEST PILOTS, page 3)



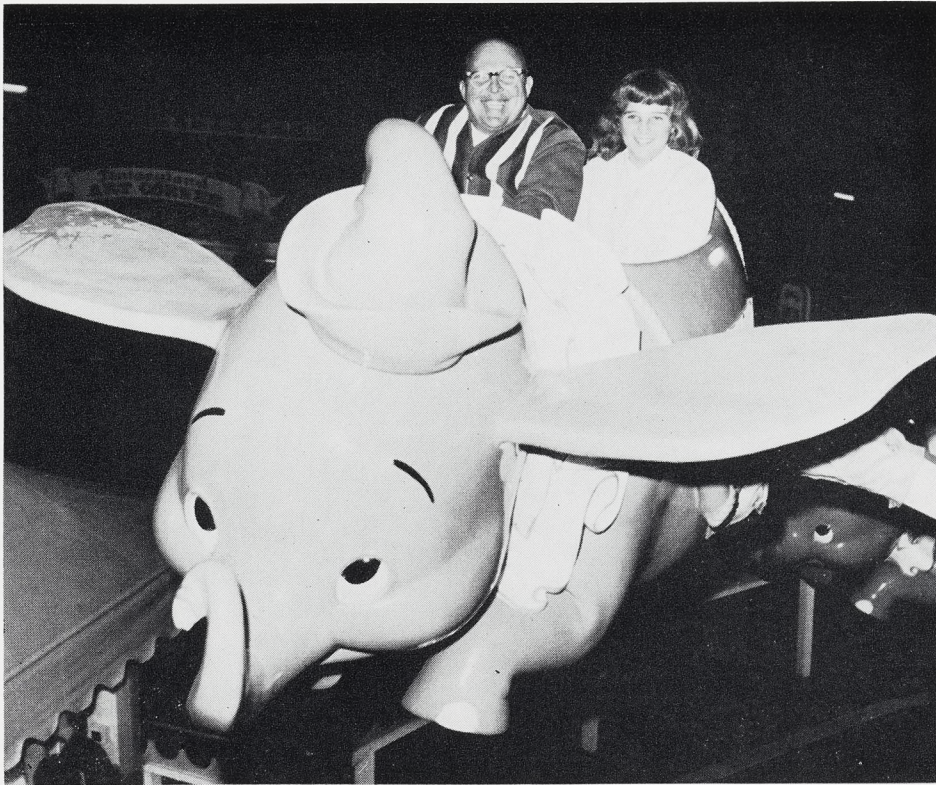
Mr. Elder



Casey Finnegan (above) stands by F-5B demonstration aircraft with portion of flags representing nations in which he has flown. Hank Chouteau (left) is chief test pilot, and John Januleski (right) supervises production flight acceptance tests.







More than 8000 persons attended the third annual NRC night at Disneyland May 27, which sponsors called the ideal crowd and the ideal night.



## TEST PILOTS: In the Final Analysis They Call the Shots

(Continued from page 2)

with The Boeing Company. He joined Northrop in 1963 and has carried the primary test pilot responsibility for a number of engineering flight programs on the F-5 aircraft. A graduate of Parks College and the Naval Test Pilot's School, Mr. Thomas was a fighter pilot with the U.S. Air Force from 1952 to 1956.

Mr. Finnegan, a graduate of North Dakota State University, served for five years as a USAF fighter pilot. He is currently a pilot with the U.S. Naval Reserve. Mr. Finnegan was an engineering test pilot at Northrop Ventura prior to working in Norair Customer Relations and accepting his present post.

Mr. Cornell holds bachelor and master's degrees from North Dakota State University and is a former U.S. Air Force pilot. He flew with Ventura Division drone support groups around the world prior to joining Norair a year ago.

Mr. Anderson is the latest addition to the test pilot team. He is a graduate of England's Williams College and the Empire Test Pilot's School. He flew 13½ years with the Royal Air Force, including extended periods as a test pilot. Mr. Anderson was with the U.S. Army Aviation Test activity prior to joining Northrop. He has had extensive experience in helicopters and V/TOL aircraft.

Northrop's two major aircraft sys-

tems—the T-38 trainer and F-5 fighter—are good examples of the extremes in aircraft testing today.

The T-38 was designed without frills to provide a capability for supersonic pilot training. Its test program, while extensive and complete, was not overly complicated.

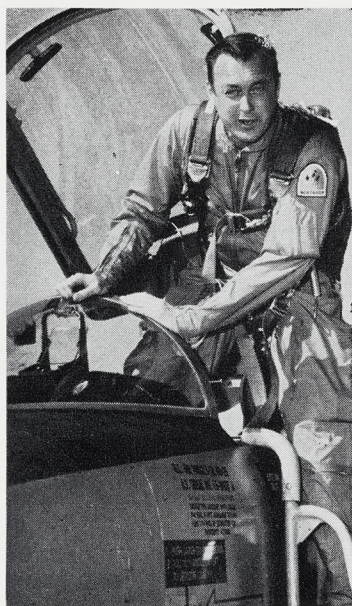
The F-5, on the other hand, was designed to incorporate all of the T-38's better features, plus the capability to deliver armament and to defend itself against attack.

Because Norair test pilots have flown extensively for military organizations in war and peace, they have an intimate feel for what the customer wants and needs in an aircraft. And they augment this knowledge with frequent personal contacts, plus trips to areas where Northrop-built aircraft are in service. These factors, coupled with their engineering background, enable them to make many suggestions of a precise nature, to the designer or the production unit involved.

"We probably have more across-the-

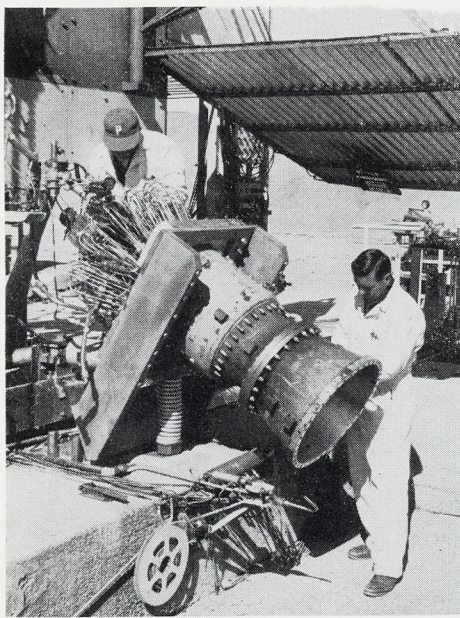
board contacts with various groups than just about any organization you can name," Mr. Chouteau said. "We like it that way. It not only gets better results but allows us to develop a more complete understanding of Norair's broader aims and accomplishments."

"Naturally, we must sometimes carry bad news. However, this advanced information allows us at Northrop to better anticipate customer reaction and to achieve the goal we are all striving for—the best aircraft we can build."

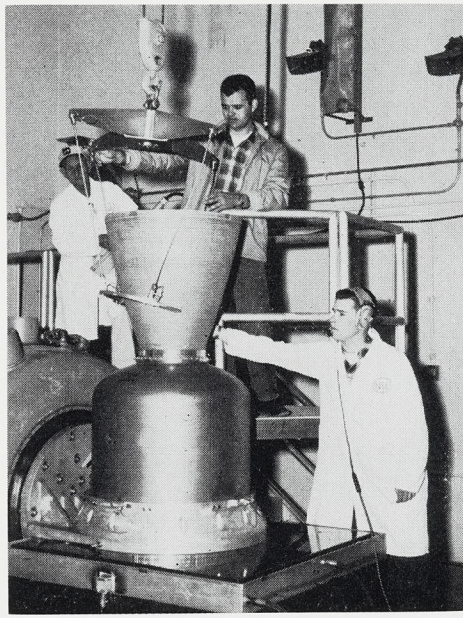


Dick Thomas (above) and Bill Anderson (left) assist Bob Elder and Hank Chouteau in engineering flight test assignments, while Darrell Cornell (right) specializes in production flight acceptance. All pilots fly all types of missions, however.

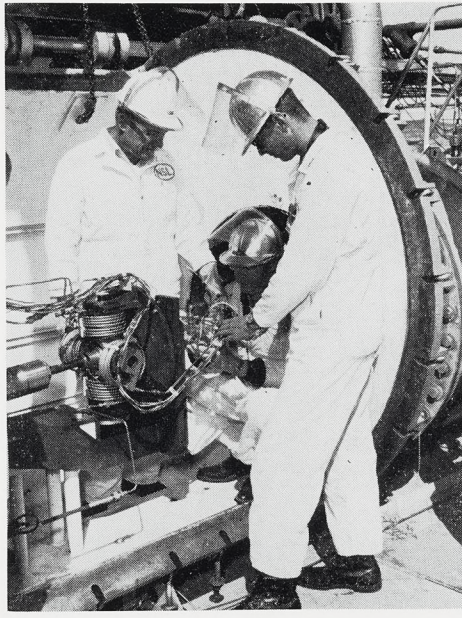




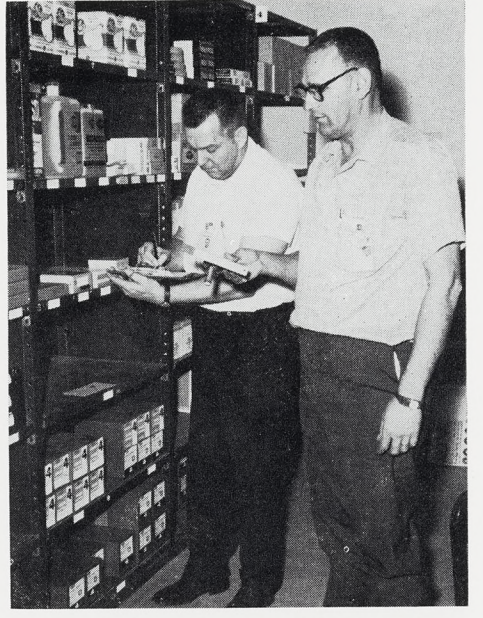
Resonant combustion rocket engine will be tested after installation on stand is completed by Bob McKeon (left) and Neil Eckenrode of Northrop Space Laboratories.



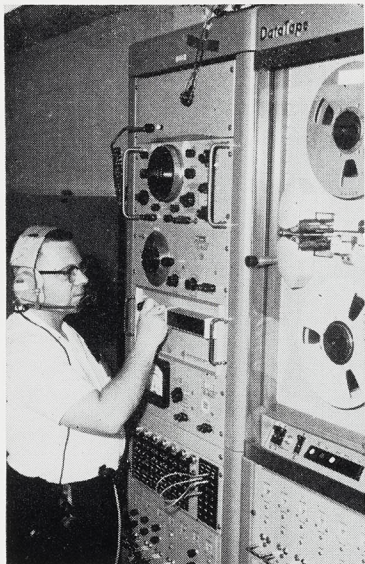
Vibration testing of Applications Technology Satellite (ATS) apogee motor is conducted by (from left) George Brothers, Phil Dee and Denis Orser.



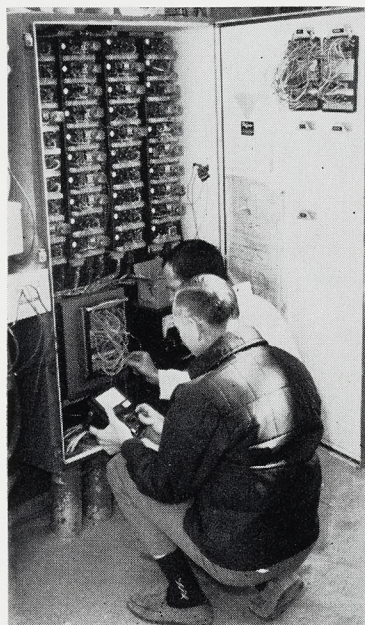
Advanced Liquid Propulsion System (ALPS) thrust vector alignment stand is installed by (from left) Larry Whalen, Sam Penrod and Jim Lumsden.



For efficient operation of NASA/JPL Edwards Test Station, supplies must be kept readily available. Taking inventory are Walt Hubble (left) and Ed Blaty.



Electronic technician Max Brown (above) operates Data Tape recording unit connected to rocket test stand. After patch-in of wiring connection to another test stand (below), Jim Turner (left) and Mike Thornberry determine voltage level on lines.



## AT EDWARDS TEST STATION

# Desert Rats and Exotic Rockets

Today Northrop Space Laboratories technicians are testing the Surveyor vernier propulsion engine and an advanced design propellant tank for possible use on Voyager. Tomorrow they will process and test a propellant batch for the Advanced Technology Satellite apogee-kick motor. The next day they will perform firing tests on JPL's Advanced Liquid Propulsion System.

These are some of the tasks assigned to Northrop's Bill Dickinson and his team of rocket propulsion specialists at Edwards Test Station (ETS). This team provides vital assistance to NASA/JPL in the development of rocket propulsion systems which will be used for future space flights.

Edwards Test Station, a remote facility of the Jet Propulsion Laboratory, is located in the northern section of Edwards Air Force Base, California. The remoteness of the facility was necessary because it was designed to test extremely noisy propulsion systems producing up to 40,000 pounds of thrust.

When you visit ETS you immediately notice things which are peculiar to a rocket test site. Special clothing and shoes are worn by some of the people involved in pouring, mixing, and curing the large solid rocket motors. Others who are handling exotic liquid rocket fuels require another kind of protective clothing.

To the outsider, other indications of the very necessary safety program quickly evidence themselves. When you enter the main gate, you relinquish all matches and lighters. You can't bring your personal car on the site. Lights on posts at the various locations on the site tell you by their color whether you can enter or not.

Above all, you are impressed with the serious attention paid to all matters of safety by all of the people working there.

And it pays off. Since Northrop assumed its responsibilities at ETS in September of 1965,

there has been no lost time due to industrial accidents.

More than 70 Northrop employees are engaged in the vital work being conducted there. They refer to themselves as "desert rats" and they are where they want to be, doing challenging work in the clean clear air of the California desert. They live in the nearby towns of Lancaster, Palmdale, Rosamond, North Edwards and Quartz Hill.

Mr. Dickinson's pleasant, efficient secretary, Alice Claiborne, should be the envy of all of our freeway fanatics. She is the wife of the stationmaster for the Atcheson, Topeka and Santa Fe terminal at Edwards, California, living within a mile of ETS.

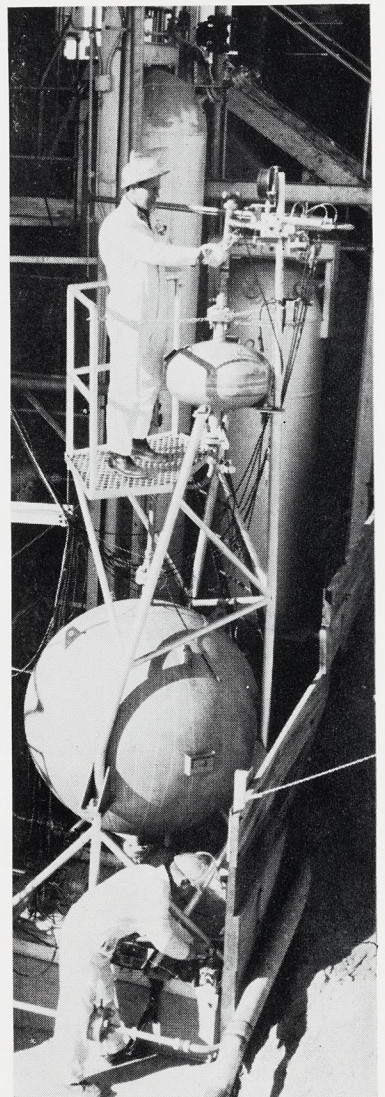
Many of these people have been in the area for several years and have developed outside activities suitable to the desert. Bob Parker is a desert wildlife expert and the official "snake catcher" at ETS. Technician Bill Zahnle has a small ranch with cows and lambs. Rockhounds George Brothers and Bill Kramer scour the desert for interesting specimens for their lapidary collections. Stan Beard, Art Lands-gaard, and Ed Blatz own light planes.

In addition to the basic tasks, Northrop-ETS supplies a vast majority of its own support. It calibrates and repairs its instruments, and provides its own on-site transportation. It stores and disburses a wide assortment of space age hardware, maintains the equipment, guards itself, keeps its own station clean and feeds (through a contractor) the people on site in a modern cafeteria. It operates its own internal communication system.

While remote, Northrop personnel at ETS avail themselves of the benefits of the NRC, and in other ways are full fledged members of the Northrop family. Discount tickets to Southland activities are especially desirable.

In their technical work, Northrop-ETS people (See EDWARDS, page 5)

Photos  
by  
Harvey Huggins



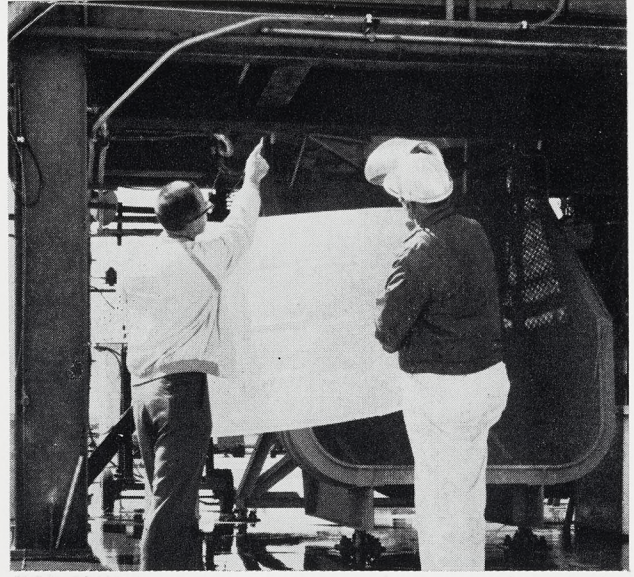
Dick Decker and Neil Eckenrode hook up oxidizer lines and connect instrumentation on ALPS oxidizer calibration system.



Working with automatic data recording and monitoring system console, Don DeClaire makes checkout runs of device used to record and play back digital computer data accumulated during tests.



Bill Dickinson (left) and Hank Carpenter examine ALPS injector installed on test stand. Mr. Dickinson heads the team of more than 70 NSL specialists assigned to Edwards Test Station.



Rocket engine test stands sometimes must be modified to fulfill different requirements of rocket propulsion programs. Ray Freeman (left) and Mr. Carpenter examine stand while pondering proposed changes.



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

**For Sale**

**Sofa**, 101" width, 2 seat cushions, 4 back cushions, contemporary decorated design, custom-made, delivered new last month, cost \$867, \$450. Bel Air, 472-2571. A

**Ford**, 2-dr. 1954 V8, stick shift, smog device, \$100. Anaheim, 714-776-3939. A

**Walkie Talkies**, 2 TMC 206 telecon 1-watt, channels 2-9, squelch control, battery meter & earphones, \$80. Gardena, 327-0461. A

**Volkswagen**, 1966, 1600 Fastback, just delivered from Germany, 185 miles, w/s/w tires, \$2495. Inglewood, 673-1589. A

**Comptometer**, 12-keyboard Felt & Tarrant, elec., \$350. Torrance, 326-6456. A

**Tricycle**, 12", red, \$4. Torrance, 323-8089.

**Hi-Fi Speakers**, Electro Voice Wolverines, LS-12 full range, MF-1 mid-range, HF-1 high freq. w/crossovers, \$35. Manhattan Bch., 374-5635. A

**Record Player**, Garrard, type A, \$50. Inglewood, 674-6395. A

**Mattress & Box Spring**, Sealy Magic Rest, full-size, \$60. Hawthorne, 675-5802. A

**Rambler**, 1963, Classic, 4-dr., r/h, air cond., new tires, 6 cyl., standard, seat belts, take over \$52.72 mo. pymts. approx. bal. \$892. Buena Pk., 714-521-0416. A

**House**, 4-bdrm., 2-story, 2250 sq. ft., fireplace, family rm., 2-bath, insulated, lge. patio, landscaped, fences, sprinklers, 1½ yr. old, all blt-ins, \$2700 dn., \$30,000. Dominguez, 632-4978. A

**C. B. Radio**, Olsen 717, 10 new crystals, new cond., \$75. Inglewood, OR 7-2369. A

**Movie Outfit**, Bell & Howell 8mm, camera w/zoom lens, projector, screen, flood lights, pistol grip, \$125. Gardena, 676-7403. A

**Ketch**, 20' Priviteer, day sailer, auxiliary motor, \$1200. Redondo Bch., 376-5479. A

**Cooperative Apt.**, 2-bdrm., 8 yrs. old, 5 minutes from Hollywood race track, free washer & dryer, children OK over 16 yrs., \$3000 dn., \$126.78 mo. pymts., \$15,000. Inglewood, 678-1649. A

**House**, 3-bdrm., 1¾ baths, plus duplex, 2 bdrms. each on 1 lot, \$335 income, 5 min. to Norair, 10% dn., \$35,000. L.A., PL 4-1964. A

**Chair**, easy & reclining, \$5. L.A., 757-3595.

**Console Hi-Fi**, radio, phonograph, microphone, \$60. Hawthorne, 676-0418. A

**Flexy Racer**, sled w/wheels, \$10. P.V. Ests., 375-4742. A

**Stenotype Machine** & case, \$30. L.A., GR 5-3484. A

**T-Bird**, 1956, h/top, silver gray, fresh o/haul, paint & tires, auto. trans., orig. owner, \$1275. Pac. Palisades, 454-2057. A

**Antique Bed**, dble. size, beautiful scrolled ends w/side rails, \$35. Torrance, 371-2706.

**Refrigerator**, Coldspot, 13 cu. ft. w/sep. freezer, \$75. Cypress, 714-828-9142. A

**Sloop**, 20' cabia cruising-type, \$2250. Inglewood, OR 7-5142. A

**Ford Falcon**, 1960, r/h, new seat covers, \$300. Santa Monica, EX 3-5983. A

**Honda**, 50cc, C102, new, elec. starter, windshield, mirrors, \$200. Inglewood, 754-3946.

**Motor Scooter**, 1963 Allstate compact, needs eng. work, \$50 or sell for parts. Inglewood, 676-8982. A

**Oldsmobile 88**, 1955 4-dr. Holiday sedan, radio, p/s, p/b, auto. trans., good tires, needs rings, \$150. P.V. Pen., 377-5907. A

**Oldsmobile**, 1956 h/top, \$175. Torrance, FR 5-0908. A

**House**, 3-bdrm., 1½ baths, fireplace, in Torrance, 10% dn., \$23,900. Redondo Bch., FR 9-9786. A

**Surfboard**, Bragg, 8'11" long, wgt. 22½ lbs., 3½" thick, clear deck, custom finish, \$65. Hermosa Bch., 372-6755. A

**Rifle**, .22 cal Winchester, semi-auto., model 902, w/near new, delux, gun case, \$40. Torrance, 375-7817. A

**Photographic Darkroom Equipment**, incl. 2¼ x 3¼, enlarger w/f4.5 lens, printer, spotometer, timer, cut film tank, roll film tanks, montage masks, 3 sets of trays, \$145. Miraleste, 831-5615. A

**Stove**, Gaffers & Sattler, 30", 4 burners, grill, broiler, oven window & light, \$75. La Palma, 827-2117. A

**Saddle**, 15½" seat, handcrafted silver-mounted, needs repair, \$900. Box 1107. A

**House**, 3-bdrm., family rm., used brick fireplace, lge. covered patio, extra lge. liv. rm. & master bdrm., 2-bath, near Knotts Berry Farm, \$22,900. Buena Pk., 828-3237. A

**Boat**, 13', w/Johnson controls, trailer, no motor, \$295. P.V. Ests., 378-3055. A

**French Poodle**, miniature, female, AKC reg., \$50. Redondo, 535-8214. A

**Clarinet**, La Sete E-Flat, Boehn sys., w/carrying case, \$50. Torrance, 371-1726. A

**Manual**, MG Workshop, new 1964 ed., Scientific Pub. Sidney, covers series TC, TD, TF1500, MGA, & MGA 1600, \$4.50. Torrance, 328-5655. A

**Washer**, G.E. Filter Flow, \$25. Hermosa Bch., FR 4-8036. A

**Pickup Truck**, 1958 ½-ton, r/h, \$700. 324-7442. A

**House**, 3-bdrm., family rm., all bltin kitchen, breakfast bar, 1¾ pullman bath, fireplace, dble. attach. gar., 70 x 115 lot, lge. patio, in Corona, \$18,500. Fullerton, 526-6118. A

**For Sale**

**MGB**, 1965, r/h, h/top, \$2395; w/out h/top, \$2295. La Habra, 691-9534. A

**Dishwasher**, portable, 6 mos. old, GE deluxe Mobile Maid, cost \$218; \$110. Huntington Bch., 714-847-2269. A

**Honda**, 1965 305cc Scrambler, less than 2000 miles, hvy. duty equip., \$600. Box 1102. A

**Mustang**, 1965, 6-cyl., stick shift, r/h, w/s/w, \$1895. Gardena, 673-1097. A

**Horse Ranch** or 2-cabin sites, 5-acre, in Willow Springs area, \$1750. Rolling Hills Ests., 325-3057. A

**Horse**, 5-yr-old gelding, gentle w/children, \$275. Box 1103. A

**Mustang GT 2 + 2**, 1965, 4-spd. trans., 4-bbl. 289 cu. in. 225 hp eng., 5 Style Steel wheels, low mileage, many extras, 1 yr. warranty left, \$2595. Redondo Bch., 376-8285. A

**Pontiac Catalina**, 1960 convt., new top, brakes & battery, \$795. Box 1104. A

**Comet**, 1960, station wagon, std. shift, \$450. Santa Ana, 531-0245. A

**Refrigerator**, Frigidaire, crosstop freezer, \$30. Fullerton, 526-2962. A

**Surfboard**, \$55. Redondo Bch., FR 5-0061. A

**Desk**, knee-hole type; corner piece & chest of drawers, has 9 drwrs., cherry teak finish, modern, \$45. Anaheim, 638-8985. A

**Dinette Set**, round, walnut Formica table w/2 leaves, 4 ivory vinyl chairs, 1-yr-old, \$50. Long Bch., 596-9748. A

**Adding Machine**, Olivetti, manual, 1-yr.-old, cost \$115, \$55. Torrance, FR 5-2929. A

**Chevrolet**, 1956, 2-dr. spt. cpe., r/h, p/s, V-8, stick shift, mag. rims, new tires & paint, \$650. Hawthorne, OS 9-2122. A

**Ford Fairlane**, 1959, r/h, \$275. Redondo Bch., FR 0-4643. A

**House**, 3-bdrm., 1-½ baths, sliding glass door to covered patio, fireplace, outside laundry rm., 3 blocks to Del Amo shopping center, dble. attach. gar., \$29,500. Torrance, 375-9459. A

**House**, 3-bdrm., bltins, birch cabinets, bltin TV/Hi-Fi area, raised fireplace, 500 sq. ft. playroom-workshop, 2½ car gar., fruit trees, walking dist. to shops, 20% dn., \$27,250. Alhambra, AT 4-5698. A

**Engagement Ring Set**, interlocking, \$180. other jewelry avail. at very reasonable prices. Hawthorne, OS 9-4723. A

**Stauffer Table**, w/attachments, cost \$350; \$75. Santa Susana, 805-527-1590. A

**Air Conditioner**, room-type, 1 hp, 220 V., 3 phase, \$30. Torrance, 371-1830. A

**Chevrolet**, 1958 station wagon, V-8, p/s, Premium w/s/w, \$695. Manhattan Bch., FR 2-2759. A

**Outboard Motors**, 25 hp Evinrude, 7½ hp Fishing Scott, \$185. Gardena, DA 4-8853. A

**Stove**, elec., 2-burner-type, \$7.50. L.A., 472-3374. A

**Camera**, 35mm, Canon IV-S2, 50mm f1.8 & 135 mm f3.5 lens, Univ. viewer, carrying cases, filters, \$200. Huntington Bch., 842-2649. A

**Mustang**, 1965, 289 4 bar., 4-spd., chrome rev. rims, \$2300. Cypress, 827-7189. A

**Lamp**, pull down-type, wall mounting, never used, \$4. Hawthorne, 676-0758. A

**Tape Recorder**, Sony, stereo, 2-track, model 522, \$65. Torrance, 375-6467. A

**Chevrolet**, 1965 Impala Super Sport, p/s, p/b, Powerglide, w/s/w, 13,000 miles, r/h, \$2300. Torrance, 376-8515. A

**Refrigerator**, 13 cu. ft., Norge, freezer compartment, late model, \$40. L.A., 766-2809. A

**Stove**, Universal, gas, 4-burner, 36", oven & broiler, \$50. P.V. Ests., 377-8572. A

**Range**, lge. deluxe G.E. elec., \$65. Inglewood, 674-5445. A

**Mobile Home**, 1-bdrm., Fleetwood 10' x 42', late 1962, carpeted, G.E. refrig., light wood paneling, \$3000. Torrance, 327-9003. A

**Studebaker**, 1957, V-8 station wagon, \$150. Hawthorne, 679-6581. A

**Dishwasher**, portable, Kitchen Aid, white, never used, \$200. Manhattan Bch., 788-7519. A

**Ford Fairlane**, 1958, convt., new tires, seat covers, police interceptor eng., many extras, \$230. Burbank, 845-9819. A

**Cornet**, Olds, \$40. Torrance, FA 8-5931. A

**Ford**, 1954, V-8 auto., good tires, 4 dr. sedan, r/h, \$125. Gardena, DA 4-0649. A

**Accordion**, 120-bass, \$100. Torrance, 379-7165. A

**Surfboard**, 9'4" Rick, 5 redwood sticks, cost \$145; \$90. Lynwood, 635-2666. A

**Volkswagen**, 1960, good eng., needs paint & bumpers, \$300. Wilmington, 835-9070. A

**Evaporator Cooler**, Coronado, 1/6 hp motor, pump, float & all plumbing, 5200 cu. ft., min. airflow 17 x 24 x 30, window-type mount, cost \$130; \$75. Hawthorne, OS 9-8644. A

**Ford**, 1948 coupe, 1963 Chev. 283 eng., new int., vibrasonic radio, orig. paint, over \$1550 invested, \$1100. Torrance, FR 8-1350. A

**Ford**, 1957 V-8, auto. trans., \$350. Hawthorne, 644-3501. A

**Hi-Fi Equipment**, Garrard 98 changer, Harman-Kardon amplifier, R-J enclosure, Jim Lancing extended range speaker, Garrard stylus pressure gauge, plus 8 assorted LP records, \$39. Box 1106. A

**For Sale**

**Ford Galaxie 500**, 1965, tudor h/top, V-8, p/s, r/h, factory air, less than 15,000 miles, \$2495. Long Bch., GA 3-1363. A

**Thunderbird**, 1961, low mileage, p/s, p/b, r/h, \$1350. Torrance, DA 3-2144. A

**Home**, 3-bdrm., family rm., fireplace, bltins, dble. gar., fenced yard, patio, extras, \$26,500. Lomita, 326-3135. A

**Plymouth**, 1957, 2-dr. sedan, 8-cyl., auto., orig. owner, 70,000 miles, \$175. Torrance, 326-1867. A

**Coin Collection**, over 300 U.S. & foreign, \$100. Box 1105. A

**Sailboat**, 8' Pram, \$175. Torrance, 324-3226. A

**Spinning Wheel**, antique New England, hand-carved in New Sweden, Maine in mid-1700's, \$65. Inglewood, 672-7424. A

**Stereo Tape Deck**, Lafayette RK-140 w/2 mikes, \$65. L.A., 472-2031. A

**Den Furniture**, Early American maple, couch, chair, end tables, coffee table, \$40. P.V. Ests., FR 7-4674. A

**Fireplace Screen**, accessories & andirons, never used, \$15. Torrance, 370-2347. A

**Truck**, Chevrolet, 1956, V-8, 4-spd. Hydro, good tires, camper shell, r/h, new paint, step bumper, \$650. Torrance, DA 9-7994. A

**Bedroom Set**, twin, mirrored vanity, night stand & chest of drwrs., semi-modern, no mattresses or box springs, \$40. Torrance, DA 6-5558. A

**Home**, 3-bdrm., family rm., breakfast bar, 2 baths, bltins, patio, fenced yard, 4 yrs. old, near high school, Sun Ray, G.I. resale, \$750. dn. \$22,750. Wilmington, 375-8778. A

**House**, 2-bdrm., full dining room, breakfast rm., fireplace, dble. garage, \$20,950. Inglewood, OR 1-3860. A

**Dog House**, \$10. Hawthorne, 675-9389. A

**Home**, 3-bdrm, paneled den, lge. all-elec. kitchen, patio, block wall fencing, 4¾% loan, or refinance, \$21,750. La Mirada, 944-1734. A

**Pups**, Weimaraner, 4 males, 5 females, AKC reg., avail. June 24, \$100. Rolling Hills, 377-1281. A

**Camera**, 4 x 5 Speed Graphic, w/Polaroid & roll film backs, 15 holders, 2 flash guns, 135 mm Optar lens, hard case, extras, \$200. Orange, 714-637-5855. A

**Home**, 3-bdrm. & den, near fwy. & schools, patio, fenced yd., plenty of storage, \$21,900. Gardena, DA 9-2904. A

**Chevrolet**, 1962, Impala, 327 eng., auto., p/s, deluxe r/h, \$1300. Norwalk, 864-9532. A

**Panel Truck**, 1955 Chevrolet, 6-cyl., stick shift, \$125. Box 1107. A

**House**, 3-bdrm., family rm., 2 baths, lge. landscaped yd., bltins, fireplace, patio, dble. gar., close to schools, 5¼% loan or terms, \$24,500. Anaheim, 827-4501. A

**Evaporation Cooler**, auto-type, 12-volt, 2-spd. fan, used once, \$20. Torrance, DA 6-5566. A

**Custom Bumper Hitch** for 1960-'65 Rambler, \$10. Torrance, FR 1-5072. A

**Television**, 17" Packard Bell, blonde oak, small console, antenna & spare tubes, \$25. Torrance, DA 3-8797. A

**Wanted to Buy**

**Copying Machine**, must make copies inexpensively & handle 8½" x 11" copy, make permanent copies, ThermoFax-type not desirable, will pay up to \$100. Lakewood, ME 3-6346. B

**Generator**, audio signal, EICO mod. 377 or equivalent. Whittier, OX 3-4117. B

**FREE (To Be Given Away)**

**Kittens**, 6 wks. old, yellow, black, white, box trained & weaned. Hawthorne, 645-7762. D

**Dog**, white German shepherd, 4 yrs. old, likes children. Gardena, OS 6-4261. D

**Kitten**, male, 6 wks. old, multicolored, frisky w/much personality. Torrance, DA 4-8372. D

**Rentals Offered**

**Apt.**, 2-bdrm., unfurn., disposal, carport, h/wood floors, 9 miles to Norair, 1 child OK, \$90. Lynwood, 635-3784. E

**Apt.**, 3-bdrm., 2 baths, family rm., fireplace, pvt. patio, bltin units, intercom, dishwasher, F.A. heat, hot water & trash pd., near Norair, \$175. Hawthorne, 679-1358. E

**Apt.**, 2-bdrm., unfurn., garage, \$105. Redondo Bch., FR 2-5310. E

**Bachelor Apt.**, furn., utilities inc., \$45 mo. L.A., PL 4-9866. E

**Home**, 3-bdrm., 2 bath, on 1 acre lot, 5 yrs. old, family room, bltins, recently redecorated, avail. July 1, \$165 mo. Thousand Oaks, 805-495-5128, 805-495-2023. E

**Apt.**, unfurn., 2-bdrm., 2-bath, pvt. balcony, air cond., playyard, underground parking, \$152 mo. Inglewood. FR 5-0867. E

**Cabin**, Green Valley Lake, make vac. reservations now, \$35 weekend; \$60 wk. Torrance, 320-2002. E

**Apt.**, 1-bdrm., pool, deluxe, \$95 mo. Redondo Bch., 376-2117. E

**Apt.**, 2-bdrm., garage, 10 mins. to Norair, \$95 mo. Redondo Bch., 370-9541. E

**Apt.**, 1-bdrm., deluxe, furn., pvt. patio, 3 mins. to Northrop, \$100 mo. Inglewood, 756-7389. E

**Apt.**, bachelor, furn., util. pd. & 1 bdrm., furn., gar., 1 block from beach near Marina, \$80 & \$110. San Pedro, 831-6789. E

**Apt.**, 1-bdrm., unfurn., enc. tub & pullman, redeco., 1 child OK, no pets, water & trash pd., \$80 mo. Hawthorne, OS 5-8335. E

**Apt.**, duplex, 1-bdrm., unfurn., w/gar., single, \$65; cple. \$75. Inglewood, PL 3-0884. E

**Duplex**, 2-bdrm., unfurn. bltins, child OK, fenced yard, near Northrop, \$125 mo. Hawthorne, OS 9-6334. E

**Apt.**, 3-bdrm., garbage disp., closed gar., water & trash pd., no pets, 10 minutes from Northrop, \$125 mo. Redondo Bch., 370-7550, OS 6-3333. E

**Vacation Cabins**, Lake Gregory & Crestline, make reservations early for June thru Sept., \$25 weekends, \$60 wk. Venice, EX 1-2040. E

**Apt.**, unfurn., 1-bdrm., near Northrop, laundry room, all elec. bltin range, car port, \$95. Hawthorne, 675-2075. E

**Apt.**, 1-bdrm., furn., 1 block from Northrop, bltins, forced air heat, adults only, \$110. Hawthorne, OS 6-5425. E

**Rentals Offered**

**House**, 3-bdrm., completely furn., garbage disp., dble. gar., rent for 3-6 mos. or longer, within walking distance of Northrop, \$250 mo. Gardena, 324-0730. E

**Rentals Wanted**

**Apt.**, 1-bdrm., furn., for 3 summer months, near plant or El Camino. Rolling Hills, 831-9707. F

**Lost**

**Lost at NSL**, blue, 3-ring notebook w/UCLA class notes plus text book Real Estate Property Management. Beverly Hills, CR 6-3534. F

**Personals**

**A heartfelt** thank you to all my many friends at Norair for their sympathy & expressions of kindness during my recent time of sorrow. MRS. DEWEY MYERS. L

**Flight Safety** engineer wants to exchange maintenance work on light aircraft for flight time. F.A.A. licensed A & P mechanic. Hawthorne, 644-2592. L

**Free Lance** photographer wanted to take wedding pictures in August. Torrance, 375-2018. L

**I wish** to thank all the wonderful people at Norair, particularly Orgn. 8800, who were so thoughtful in remembering me with flowers, cards & good wishes during my recent illness. CLAIRE PAYNE. L

**Share Driving** & expenses to Pittsburgh, Penn., leaving on or around June 24, return by July 18. Inglewood, 677-5705. L

**For Sale or Trade**

**Pickup**, Chevrolet, 1966 ½-ton, custom cab, Powerglide, 283 cu. in. V-8 eng., low mileage, \$2790 or trade 1960-'61 auto for \$600 equity & assume \$87.94 mo. pymts. L.A., 589-8682. M

**Projector**, Bell & Howell, \$100 or trade for bedroom furniture. Inglewood, 672-4486. M

Going my way?

**Rides Wanted**

**7 a.m.—3:45 p.m.**

**Avalon Blvd. at San Diego Frwy.**, L.A. B. Slack, Norair, ext. 2605, 632-7661. 2

**7:30 a.m.—4:15 p.m.**

**Vermont & 184th St.**, Gardena. Joan Adamo, Norair, ext. 1316, DA 9-1526. 3

**8 a.m.—4:45 p.m.**

**Highland & 33rd St.**, Manhattan Beach. Two girls want ride. Ymelda Fettig, Nortronics, ext. 403, FR 2-4947. 5

**Orange Ave. & Del Amo**, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 5

**Irvine & 17th St.**, Newport Beach. Interested in starting 2-man car pool from Costa Mesa Newport area. E. K. Reese, Norair, ext. 1815, 646-1387. 5

**Manhattan Beach Blvd. & Prairie Ave.**, Lawndale. Eleanor F. Maisano, Norair, ext. 2123, 370-3365. 5

**Rides Offered**

**8 a.m.—4:45 p.m.**

**Orange Ave. & Del Amo**, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 15

**Irvine & 17th St.**, Newport Beach. Interested in starting 2-man car pool from Costa Mesa Newport area. E. K. Reese, Norair, ext. 1815, 646-1387. 15

EDWARDS TEST STATION

(Continued from page 4)

ple work side-by-side with a score of JPL engineers and scientists on the several programs in progress at any one time.

The solid and liquid rocket developments performed at ETS include fabrication, assembly, environmental test and test firing of rocket components.

Northrop people prepare both solid propellant rockets and liquid fuel engines for the various environmental tests required to verify that the propulsion systems will operate properly during their flight missions.

Live test firings on the seven centrally controlled test stands at ETS are a major part of these programs. Static firing operations are conducted with the motors bolted to the test stands.

Development and qualification testing, both of engineering prototypes and of production motors exactly like those which will operate on spacecraft, provide data on the effect of various environments on the rockets.

The following factors determined by development testing are used by JPL to evaluate the ability of the propulsion system to function properly:

Operation under the vibration and temperature extremes of the actual mission; Stresses imposed by "G" loading, radiation environment, and the vacuum of space; Shocks caused by transportation in trucks over rough roads during either hot or cold temperature extremes;

Heating from the combustion of the motor itself.

Northrop-ETS has both a next-door neighbor and a down-the-street neighbor in the Northrop family. Next door is Northrop's Flight Test facility at Edwards Air Force Base. Neighbors being what they are, technicians are loaned to ETS by EAFB to accommodate peak workloads. "Down-the-street" is Northrop-Palmdale with additional help if and when needed.

Mr. Dickinson, Northrop-ETS's project manager, is proud of the people and the work they do.

"Both the experience and intelligence level of our people handling every job is well above average," he reported. "This has a lot to do with the success of our programs and our excellent safety record."

Though proud of its safety record, the organization is prepared to cope with emergencies. A trained volunteer rescue crew stands ready to man a specially prepared truck containing equipment to meet industrial or medical emergencies. These men are well prepared to help their fellow worker.

Northrop is thus contributing to our space efforts in yet another area, the development of rocket propulsion systems. Northrop-ETS is a valued member of the family of remote support projects being developed under Louis Brennwald and the Northrop Support Operations department.



## Blood Drive For Vietnam Expanding

The response of Northrop personnel to an appeal for blood for the armed forces in Vietnam resounded loud and clear this month with three planned bloodmobile visits and record turnouts expected.

Defense Department officials had asked for a nationwide drive to raise 250,000 pints of blood to replenish seriously depleted stocks in Southeast Asia. Los Angeles and Orange Counties are attempting to procure 17,500 pints.

Special bloodmobile visits have been set up, and the sign-up of blood donors is under way with early response indicating record donors will be available.

Northrop's Antelope Valley work force at Palmdale and Edwards Air Force Base kicked things off June 2 with a blood bank operation held in Palmdale and arranged to overlap two shifts.

June 16 Norair and Nortronics personnel in the Hawthorne area follow up with a bloodmobile visit at the Norair Product Display building from 7:30 a.m. to 12:30 p.m. Donors are being accepted from all facilities in the area.

Nortronics Anaheim will hold its special bloodmobile visit June 22 at a site yet to be selected. The hours will be 12:30 to 4:30 p.m.

Blood given at these special sessions will be available for use in Vietnam. In addition, Northrop's credit with local blood banks will be increased by the number of pints given. Thus, the blood will be available for use by employees and their families without cost.

Contact Personnel Activities for information on any of forthcoming bloodmobile visits.

### RIDER

(Continued from page 1)

Davis said. "I guess that is about all presently open to women. I'll add roping to my field as soon as Flako Boy is trained sufficiently."

Despite her unusual number of trophies and ribbons won, Miss Davis has never ventured out of the amateur class. She may, however, take a fling at professional competition later, when her stable is complete and trained.

## AND JOLLY GREEN GIANT

### Marksman Discover 'Twilight Zone'

Two former skeptics, Wade Tilley and John Morrison, now believe in the "Twilight Zone" as the result of recent events at Camp Pendleton where the two men engaged in an annual California Rifle and Pistol Association (CRPA) match.

Through a mixup in billeting arrangements on the Marine base near San Diego, the two Northrop Ventura employees came closer than they would like to remember to being shipped to Vietnam. Both men are members of the Apollo program staff.

Mr. Tilley, a World War II ex-infantryman, tells the story this way:

"We arrived at Pendleton about midnight, very tired and sleepy. We looked around for the barracks assigned to CRPA for about an hour before we



OO LA LA MONSIEUR—Nortronics lensman Val Hawes appreciates subjects like these and so does Ed Mosher (right), NRC Art Club commissioners. Cuties, decked out in hostess costumes, are Joyce Hatfield (left) and Judy Kauffman who presided at recent Carnevale des Arts which drew 200 spectators. Paintings were crowd favorites (see story below).

## Apollo System for Block II Brings New Challenges

Northrop Ventura is engaged in a new challenge to advance paradynamics technology as well as the Division's capability in this field as Block II of the Apollo program commences its sixth month of activity.

According to Chief Project Engineer Russ Lenhart, the Block II command module has been significantly modified from Block I, making a considerable impact upon Earth Landing System requirements.

Previous command modules were designed primarily for ballistic and earth orbital flights, while the next phase of the program to put a team of astronauts on the moon requires a capability for lunar orbit and docking with a lunar landing vehicle.

The command module is designed and built by North American Aviation's Space and Information Systems Division, which awarded the multimillion dollar ELS contract to Northrop last January.

One of the more significant changes in the command module is the airlock which permits astronauts to enter and leave the ship while in space. The airlock has taken on an inverse taper with the top being larger than the bottom.

### Art Club 'Carnevale' Brings Big Turnout

Northrop Recreation Club's annual Carnevale des Art staged by the Art Club is proving to be a real crowd pleaser after two years.

Approximately 200 visitors turned out May 24 for the event, staged at NRC Clubhouse, Fullerton. They viewed some 200 original works of art, enjoyed motion picture films and refreshments.

Guests cast their ballots for their favorites among the paintings exhibited. A work by Jack Flannagan was most popular, followed in order by works by Elaine Kennedy and Harold Leff.

nearly ran out of gas and had to go off base.

"We returned and found the building, were issued blankets and directed to another building where we were to sleep during the three-day competition.

"By now it was 3 a.m. and we were well into the 'Twilight Zone.' We weren't anymore in bed when a loudspeaker started calling names. We began to suspect something was wrong, and a closer look around indicated the room was full of men, and overseas bags were at the foot of each bunk.

"But we drifted off to sleep again. About 4 a.m., my bunk started shaking like an earthquake had hit. I pulled the covers off my head and there was the jolly green giant wearing a white helmet.

"He ordered me up. All I could think of to say was, 'but I'm a civilian.' Anyone who has ever been in the service can imagine the reaction of a sergeant who's just been told that a sleepy GI is a civilian."

It took a lot of discussion, well punctuated with exclamations, but the sergeant was finally convinced. The men later discovered that other CRPA shooters were in the same building but a different area. They went on to compete in two days of individual marksmanship and a team event on the third day which included four other members of the Northrop Ventura Rifle and Pistol Club.

"If it wasn't for the fact that I very much wanted to shoot in the match, I might have gone along with the tide of events," Mr. Tilley said.

## In These Tight Money Days, Credit Union is Booming

Here's an interesting bit of information in paradox to current talk of climbing interest rates and "tight money".

Northrop Credit Union has not increased its interest rates and has ample funds for approved loans.

Which means Northrop employees at the Corporate office, Norair and Nortronics west coast facilities can continue to borrow for such purposes as new or used automobiles or mobile homes, to make home improvements or to meet personal obligations. All without worry of higher rates.

More, Credit Union loans often save the borrower from 6 to 10 percent in avoiding higher rates and carrying charges. And loans can be repaid through convenient payroll deductions on a set schedule.

The board of directors of the Credit Union last month approved two new features to enhance doing business with the Credit Union—the increase of the maximum of unsecured loans to \$1000 and the removal of length restrictions on mobile home purchases.

Any Northrop employee may become a shareholder in the Credit Union by purchasing one share (\$5) and paying a \$1 membership fee. After that he is entitled to full participation in all the benefits available.

In short, in doing business with the Northrop Credit Union you are a member, not a customer. And you are borrowing not from an institution, but from your friends and fellow employees who are the Northrop Credit Union.

And just in case you do not need a loan, but have money to spare, the Credit Union is still a good place to do business. For the last three years dividends paid by the Credit Union on savings have been six percent or above.

Contact the main Credit Union

### Sierras Pack Trip Planned for July 4

Northrop Recreation Club has something new to offer the outdoors type—a July 4th weekend pack trip to the Hilton Lakes area of the Sierras.

Open to all ages, the group venture will include easy pack trails to some of the most beautiful "high country" points where trout fishing is at its best.

A kickoff meeting is planned for 7:30 p.m., June 14 at NRC Clubhouse, Hawthorne.

office, ext. 1117 at Norair, or your local Personnel Activities or Industrial Relations office for further information.



Warren Prentiss, senior engineering writer at Nortronics Hawthorne, has been reelected president of the Los Angeles Alumni Chapter of Alpha Kappa Psi, national professional business fraternity. Mr. Prentiss is also vice president and membership chairman of the Peninsula Chamber of Commerce and is a member of the Palos Verdes Community Arts Association and Rotary Club. He joined the fraternity in 1933 while attending Northwestern University.

### Manufacturing Group Plans Baseball Night

An all-Manufacturing baseball night at Angel Stadium is being planned by Nortronics personnel for June 25.

That's the night the Angels meet the Baltimore Orioles. A block of 150 tickets on the terrace level (between home plate and third base) has been obtained. Tickets are available at \$3.50 each through Personnel Activities.

### Modelers Launch Classroom Series

The Northrop Modelers, NRC-sponsored model airplane group, have launched a new series of classes to teach neophyte enthusiasts the art of building and flying radio-controlled model planes.

Initial class was held at 7:30 p.m., Monday, with subsequent sessions to be held each Monday at the same time at the NRC Clubhouse, Hawthorne.

Earle L'Homme, NRC commissioner, advises there is no charge for this service, but children under the age of 16 must be accompanied by a parent.



YOU PUSH THIS BUTTON DOWN—Earle L'Homme (left), NRC Modelers commissioner, shows group of interested plane builders the finer points of radio-controlled aircraft, subject of a class now in progress. From (left to right) are Tracy Lunt, Dennis Keck, Vern Johnson, Vern Keck, Mike Bayes, Fred Olson and Don Hicks.



## Fighters Log 4000th Hour In Combat

Northrop-built F-5 tactical fighters, flown by the Air Force's 10th Fighter Commando Squadron, late last month racked up their 4000th combat hour in Vietnam.

Details covering the milestone flight were contained in an Air Force release from Bien Hoa Air Base, Vietnam.

Major Billy G. Rippey was flight leader, and Captains Clyde L. Johns and John W. Carlson pilots on the 4000th hour mission, a strike against a Viet Cong supply center 30 miles from Saigon.

A review of the 4000 combat hours shows the F-5's have flown more than 3500 air strike sorties in both North and South Vietnam. On these strikes, 10,000 bombs of various sizes were delivered, 5000 2.74-inch rockets were launched and a half-million 20mm cannon shells expended.

The F-5 pilots have been credited with a possible kill of about 435 Viet Cong, destroying 11 bridges, triggering 91 secondary explosions and destroying or damaging many enemy-occupied buildings and fortifications, plus transportation equipment.

Unit pride among members of the 10th Fighter Commando Squadron, the only F-5-equipped unit now in Vietnam, continues high. Flight crews keep the easy-to-maintain fighters in top condition and combat-ready. Two, S/Sgt. Dennis A. Christensen, crew chief, and A1C John G. Hooker, assistant crew chief, have sent their F-5 out on 35 consecutive combat sorties without an operational discrepancy being written against it.

Pilots like the simplicity of the F-5. One, Colonel Wiltz P. Segura, vice commander of the 3rd Tactical Fighter Wing of which the 10th FCS is a part, recently became the first pilot to fly the F-5 in combat without going through a special training school.

Colonel Segura, in just two days' time, checked out in the F-5 and on his fourth flight took part in a combat sortie against the Viet Cong near the Cambodian border.

(See COMBAT, page 6)

## AID-NORAID IN ACTION

### Helping Hand in Personal Tragedy

The recent experience of a Northrop couple graphically shows how charitable dollars, like those given by Northrop people through their AID-NORAID efforts, are put to use.

It involves the late Mrs. Maud Cole, mother of Ruth Forstrom of Nortronics - Hawthorne, a mother-in-law of Lloyd Forstrom of Norair. They asked it be published merely as an indication of how such dollars are put to use.

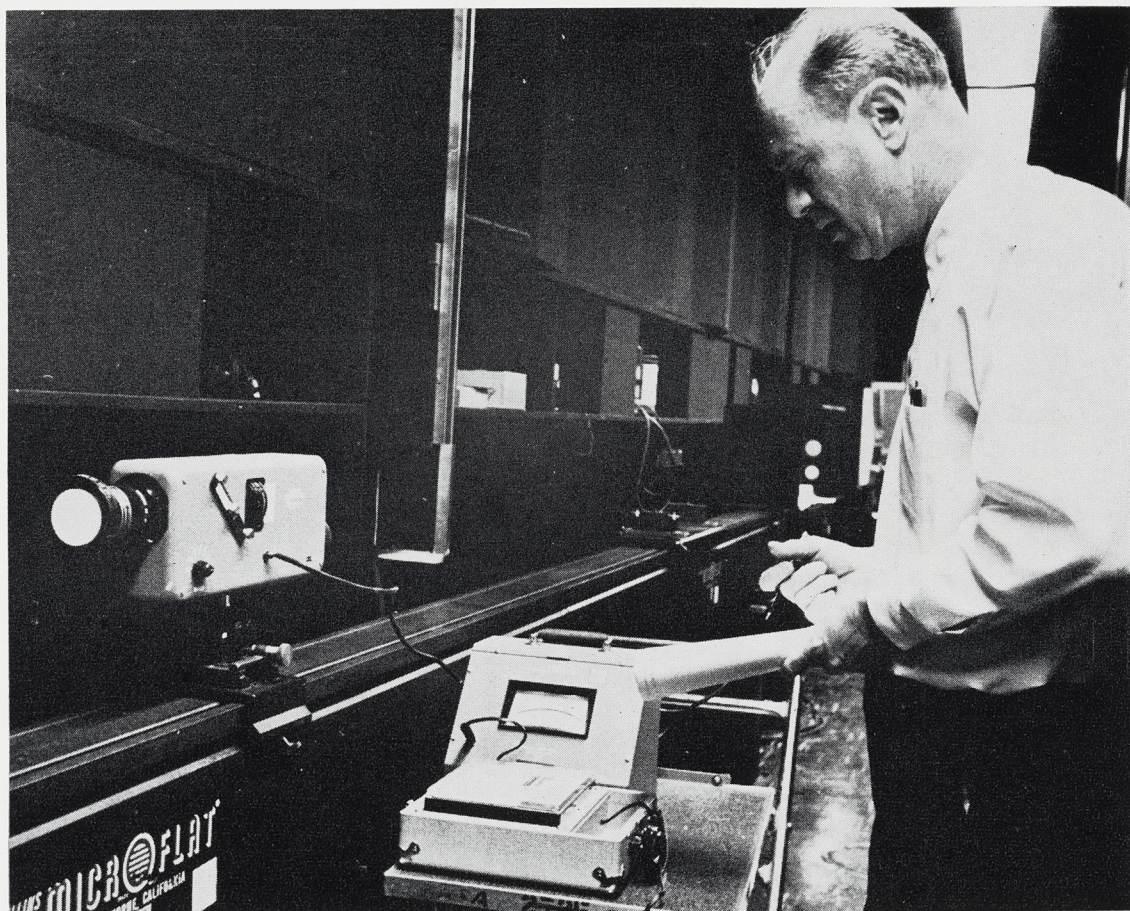
In April 1964, Mrs. Cole was first admitted to the City of Hope

Medical Center, one of the agencies supported by AID-United Givers dollars and a recipient of Northrop employees' money through AID-NORAID. She was in and out of the hospital for the next 18 months.

First indications were leukemia, although both diabetes and a heart condition developed later.

Mrs. Cole received more than 36 pints of blood, drugs and medicines, nursing care, and the help of many medical specialists and doctors, all without charge.

## TUNEUP OF X-15 COMPONENT



Head of Photometric Standards Laboratory at Nortronics Palos Verdes, Walt Clark, calibrates photometer (left) he used at Edwards Air Force Base for recalibration of Nor-

tronics sky radiance spectrophotometer on X-15. Laboratory photometer is being checked against National Bureau of Standards lamp of known luminous intensity.

## 25 CELEBRATE ANNIVERSARIES THIS MONTH

June is a banner "anniversary" month within Nortronics west coast operations with no less than 25 individuals scheduled to receive 10 or 15 year Northrop service pins.

Fifteen-year awards lead with 13 recipients, including George Stellmacher, Glenn Gillet, Vina Van Bubar, Alvin Keener, Susan Maclaren, John Botto, Donald Weaver, Anna Butcher, Jeanne Andrecht, Betty Woodruff, Richard Gorom, Luverne Boland and William Longworth.

Ten-year pins went to Verda Campbell, Richard Metzger, William McNair, Earl Egler, jr., Joseph Coles, jr., William Wilver, Conrad Irwin, Donald Mozzoe, Gerald Knowles, Louis Colombana, Perry Bezanis and Paul Engelder.

## 'Most Accurate Landing Yet' Brings Gemini Chute in View

"If a Gemini landing gets any closer than this one, we'll have to back off the carrier."

This smiling comment by Air Force Lt. General Leighton I. Davis described in capsule form the extraordinary accuracy with which the Gemini 9 crew brought their spacecraft to an Atlantic Ocean landing on June 6.

General Davis is Defense Department manager of Manned Space Flight Support Operations which includes the Naval recovery forces which were on the right spot at the right time for the record-breaking recovery of Astronauts Thomas P. Stafford and Eugene A. Cernan.

For the first time since beginning of the two-man Gemini flight program early in 1965, the landing accuracy was such that the Northrop Ventura main parachute landing system was clearly visible from the deck of the re-

covery carrier, the U.S.S. Wasp. With TV communications relayed by way of the Early Bird satellite, the 84-foot orange and white parachute with the spacecraft in tow also was visible to millions of television viewers in the Western Hemisphere.

Although the Gemini 9 spacecraft actually overshot its aiming point by some three miles, a quirk of the weather erased half of that landing error. After the main chute had deployed at about 9600 feet, an easterly breeze drifted it back toward the aircraft carrier.

Dr. George Mueller, associate administrator of the NASA Office of Manned Space Flight, termed the accuracy of re-entry and landing as one of the two greatest accomplishments in the Gemini 9 flight. The other major accomplishment, he said during a post-flight news conference, was the fact that Stafford and Cernan successfully tried three different techniques of rendezvous with another object in space.

The suspense, which built up during the communications blackout of re-entry, was broken about 5½ minutes before scheduled splashdown when the Wasp reported radar contact with the spacecraft at 50,000 feet. Moments later, Stafford reported to Mission Control in Houston that the drogue parachute had deployed.

The first official confirmation that the main Northrop Ventura parachute had deployed came when the picture appeared on television screens in the Mission Control Center at Houston. Com-

(See GEMINI, page 6)

## DSSP Roles Discussed at Conference

Representatives of three major participants in the Deep Submergence Systems Programs (DSSP)—the U.S. Navy, Northrop Nortronics and Lockheed Corporation—gathered at Nortronics Anaheim early this month for a round of conferences.

The DSSP effort is an extensive underwater research and development program guided by the Navy's Deep Submergence Systems Project office under the chief of Naval Material.

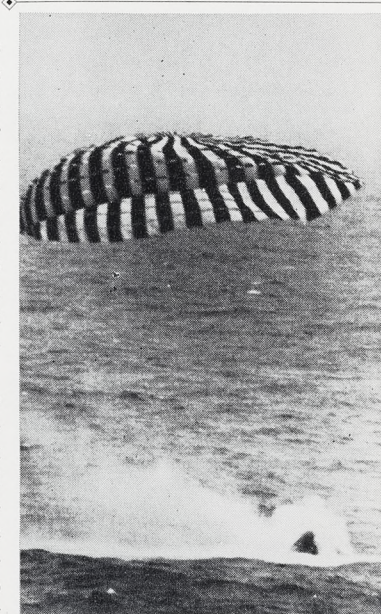
Nortronics is systems engineering support contractor for the Navy, a sort of strong right arm carrying out multiple duties related to DSSP activities.

Lockheed Missiles and Space Division has been selected by the Navy to design and construct a prototype Deep Submergence Rescue Vehicle (DSRV), one of several phases of the over-all DSSP effort.

Art Krapf, Northrop's DSSP program manager, called the talks general in nature to define the various roles involved in carrying out program objectives.

"Northrop, Lockheed MSC and the Navy have worked effectively and harmoniously for years on the Polaris program," Mr. Krapf said. "We hope to continue this fine relationship in still another field."

Lieutenant Commander A. Skolnick, Richard Worth and L. Cathers represented the Navy DSSP office. Jonathan Barker and N. Vytlaclil represented Lockheed MSC, along with Lieutenant Bob Willingham, USN, who is attached to the Navy Special Projects office at Lockheed.



NASA photographer records impact of Gemini 9 spacecraft as it descends by parachute into the Atlantic Ocean, 345 miles east of Cape Kennedy June 6. This marked the first time that a photographic record had been made of an American spacecraft splashdown. All spacecraft landings to date (Mercury, Gemini, Apollo) have used the Northrop Ventura Ringsail parachute.



## CLUB NUCLEUS MEETS

## Enthusied Retirees Map Plans

A nucleus of Northrop Corporation retired personnel gathered at NRC Clubhouse, Hawthorne, June 12 to begin planning a full slate of activities for retirees and their spouses.

This initial get-together was open to all retirees with more than 50 turning out from among several hundred who have indicated an interest in a retiree organization. Combined NRC Councils from all Northrop divisions have participated in the preliminary efforts in creating this organization which will be operated by and for retirees hereafter.

A major order of business was the selection of steering committees to plan for future activities. And those attending elected to hold a second meeting from 12:30 to 2:30 p.m. Monday, July 11, NRC Clubhouse, Hawthorne. All retired personnel and their spouses are invited to attend and help get the new group started.

Named to important committee posts were: Nominating committee, Norbert Lorentz, Walt Brophy and John Merritt; Clubhouse committee, Molly Fay, J. R. Lindley and Jeannette Kaupp; Reunion committee, Rene Rotte, Margaret Bruchy and C. C. McLean; and Newsletter committee, Norbert Lorentz, Jeannette Kaup and Walt Brophy. All committees have staged meetings since the initial get-together.

Especially needed at this time are additional volunteers from among the retired personnel ranks to help carry out specific organizational assignments. Those interested may drop a note to Norair Personnel Activities office indicating their scope of interest and when they will be available to help.

Seven lucky participants in the initial meeting received door prizes. Lou Combs and Jack Fleming received special prizes as the oldest retirees in attendance. Each is 81 years young. Others winning prizes were M. E. Mills, B. V. Morley, Alvera Hayes, Jack Dyer and Charles Kant.



REMEMBER THE FIRST ONE?—Talon model, one of several door prizes, interests Northrop retirees at recent get-together. Event drew over 50 retirees who started planning and work toward creation of a retired employees' organization. Next meeting, open to all retirees, is at 12:30 p.m., July 11.

## Vacations and Accidents: The Cycle Begins Again

Vacation time is here again and hundreds of Northrop families will soon forget work for a time and embark on ventures of their own choosing—travel, camping, fishing, boating, visits or just plain relaxing.

For the majority it will be a happy time. For a few the dark shadow of accidents will mar festivities.

The men who guide major Northrop safety programs, Lee Johnson and Harry Clark, have a suggestion that might help prevent some of these accidents—plan now to integrate some on-the-job safety concepts into your off-duty activities.

Far fetched?

Not when you think about it. First, only one accident occurs at work for every seven occurring off-duty. That's a pretty good endorsement for on-the-job safety habits. Actually, most of us live by pretty much the same standards on and off the job, so why the big difference in accident ratios? You must decide that for your-

self.

Start by reviewing the things you do and do not do at work to prevent accidents, then apply the same safety concepts to your vacation plans. Explain your ideas to the family and enlist their cooperation. Don't overlook a single day or hour to a planned safe vacation.

Above all, have the one indispensable vacation item—the automobile—thoroughly safety checked before starting out. Tires, lights, wipers, steering and brakes should work perfectly.

Each week in the United States 1000 people are killed and 34,000 injured in automobile accidents. Most frequent accident causes in order are discrepancies in the driver, automobile, highway and pedestrians. And the most common driver-committed errors are tailgating (following too closely), drinking, not yielding the right of way, traveling too fast, and crossing centerlines.

Oh, yes, don't forget, courtesy equals safety on the road.

## NASA APPROVES CMIP PROGRAM; BIDDING AIDED

The National Aeronautics and Space Administration (NASA) Cost Reduction Board has approved Northrop Corporation's Cost Reduction Program.

Announcement of the approval was made in a letter to Thomas V. Jones, Northrop president and chairman, from Dr. Wernher von Braun. Dr. von Braun is director of NASA's George C. Marshall Space Flight Center in Huntsville, Alabama.

The certification of Northrop's Cost Reduction Program means the corporation is a formal participant in the NASA-Contractor Cost Reduction Program.

As such, Northrop and other formal participants will—under President Johnson's policy—receive recognition for cost reduction accomplishments in future award determinations.

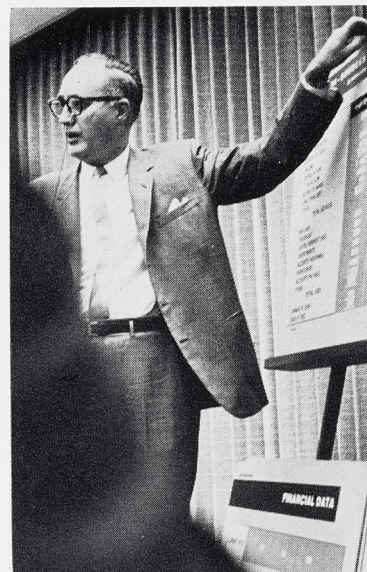
Ken Hornor, corporate coordinator of Northrop's Cost and Management Improvement Program said, "We are most pleased to have received this approval and recognize there is need to give continued emphasis to the program in order to retain this certification. There will be periodic reviews of our performance, and the first of these will be next Friday."

Aubrey D. Smith, chief of the Cost Reduction and Value Engineering office at the Marshall Space Flight Center, and John Miller, his assistant, will visit Northrop for this review.

Northrop's Cost and Management Improvement Program was established in August 1963. The program is conducted with the assistance of CMIP coordinators appointed by Division general managers. H. K. Davidson is Norair coordinator; Jim Penrod, Nortronics; and Les Hudson, Ventura.

## GOLF SIGNUPS

Signups for the July 9 Northrop Norair golf tournament at the Circle R Country Club in Escondido will begin Monday and continue through Friday, July 1. Personnel Activities has announced.



James D. Willson, partially obscured by arm of an attentive listener, projects Northrop's financial growth in presentation to members of the Los Angeles Bank Credit Men's Association. Mr. Willson, Northrop's vice-president—finance, predicted the company's contract acquisition would reach a half billion dollars for fiscal 1966 which ends next month. The bankers were guests of Northrop Norair recently.

## Edison Page Awarded Contract in Greece

Edison Page, S.p.A. of Rome, Italy, an associate of Page Communications Engineers headquartered here, has been awarded a \$6 million contract by NATO for a large communications complex in Greece.

Under terms of the contract, Edison Page is responsible for selection and installation of all electronic and communications equipment. Hellenic Technical Works of Athens, the joint-venture associate, is responsible for the electro-mechanical requirements of the project.

Edison Page, S.p.A., has earned international recognition for outstanding performance in communications systems engineering, management, and implementation on similar complex projects for the NATO countries.

Formed in 1958 by Page Communications Engineers and the Societa Edison of Milan, Edison Page combines U.S. technology and Italian scientific capability for the engineering and construction of advanced communications networks.

## AUTHOR'S CHALLENGE TO SCIENCE

## 'Will We Be or Won't We Be?' That's Henry's Question

When Henry Still, who is head of Public Relations at Northrop Ventura, asks a question, watch out. Not only might it take as much as 10 years to answer, it's likely to be of considerable magnitude.

During the tumultuous days at the close of World War II—in an ambivalent atmosphere of elation at peace and apprehension of the atomic bomb—Mr. Still asked himself: "Will the human race survive?"

Last month his personal struggle with the oft-repeated question was climaxed by the publication of his second book, *Will the Human Race Survive?*

(His first book, a biography of aviation pioneer Glenn Martin entitled *To Ride the Wind*, was published in 1964).

"Actually the book deals more with the challenges to the scientific community which must be met if we are to

continue to grow and expand," the author said in an interview this week. "There has never been any doubt in my mind that we will survive."

Water (desalination), power (nuclear energy) and space (land on which to live) is Mr. Still's three-fold challenge to the technological community.

"Today for the first time in the history of civilization men are actually at work upon the basic techniques which can provide unlimited expansion of humanity for centuries to come," he writes.

"When stripped to the core, what things do men need to live and grow in addition to food, clothing and shelter? They are three: 1. water, 2. power, 3. land on which to live."

With this as his outline, the author has skillfully managed to give historical background, the present situation and plans for the future on each subject. Interspersed with analyses of the three subjects is his own commentary on the peculiarities of man and his social order which have brought about the need for drastic, positive and immediate action.

On water, Mr. Still writes:

"Men have been much like children given a large box of candy. They eat it all in a day, become ill from the excess, then cry tomorrow because the candy is gone."

Solution of the water crisis depends on continuing technological developments in sea water conversion, he says.

"... There is every reason to believe that every city in the world located on a seacoast, the shore of a salty lake, or near an underground source of brackish water, can be utilizing desalted water at reasonable cost by the turn of the twenty-first century."

On power, he writes:

"Human history is written in the ingenious techniques and tools men have discovered to use... power. The story of man's propagation over the earth and beyond will continue to be written in the procedures he conceives to multiply the strength of his hands by the abundance of latent energy in the universe."

The search for techniques to control thermonuclear energy is the "Holy Grail, the true and permanent answer to the world's power hunger," he says.

At the present rate of energy consumption, the supply of deuterium (the fusion material which provides thermonuclear reaction) contained in the world's oceans would serve the human race for 20 billion years, the book points out.

On space, the author writes:

"There is no shortage of land. There are 33 billion acres of it on earth, only 10 percent of it now occupied either by people or food crops. Human toil and goodwill are the only ingredients needed to make proper use of this world... Water and power can make them all livable."

But despite all the room for expansion on earth, man will continue to be driven by something within him to explore and colonize the universe. This fact leads Mr. Still into one of the best short histories of our space program to date.

Water, power and space. Libraries have been written about each subject. But the author, who has been an "in-

(See AUTHOR, page 3)



Mr. Still



## REAL JIM BLACK (BOTH OF THEM) STAND FOR SAFETY

Within Northrop Corporation personnel ranks are many family groups, yet Northrop Norair reports the first incidence of a father-son team serving together on a safety committee in the long history of safety committees at the Division.

The men are James S. Black, sr. of Forward Fuselage, Mate and Complete, and James S. Black, jr. of the Boeing Wing organization.

They are serving as members of the Workmen's Safety committee. The father-son relationship was not planned, since each man was selected for this key role independently by his supervisor.

The senior Mr. Black has been with Norair since September 1951 and the junior Mr. Black joined Norair in early 1952.

James Black, jr. is doing his bit to help keep the Black family ties intact at Northrop. His wife, June, is a former Norair employee who currently works for Nortronics at Palos Verdes. And his daughter's husband, Virgil Frazier, joined Norair last week as a machinist. A son, Dennis Black, worked for Norair for a time before leaving a year ago to enter college.



James, Jr.



James, Sr.

## Maintenance Course Completed by Brazel

J. W. Brazel, a member of the Plant Engineering staff at Northrop Ventura, has completed a course in maintenance supervision conducted by the American Institute of Maintenance.

The 24-lesson course covered the basics of supervision and how they are applied to building maintenance, operation and sanitation.

Announcement of Mr. Brazel's completion of the course was made by Clyde W. Corder, chief of Plant Engineering.

The course is available only to men who meet AIM standards and have a minimum of one year of experience in building maintenance.

Mr. Brazel received a Certificate of Completion in a presentation at Northrop Ventura.

## AUTHOR: His Triumvirate

(Continued from page 2)

side" observer of all three for 25 years as a journalist and aerospace public relations executive, is one of the first to chronicle that historic crossroads where all three topics are merging into a unified goal of mankind.

The book is unique in another aspect as well. Despite wealth of statistics and documentation used to support his analyses, the work is refreshingly readable.

The reader is impressed with the author's ability to capture what is meaningful and express it with the fullest resources of the English language from the first sentence:

"On a mountainside in Colombia, in South America, there is a woman who picks coffee beans." to this look at outer space:



Norair's Elmer Alloway processes pliable skins, each two-thousandths of an inch thick, prior to bonding operation that produced solar panel substrate for Surveyor spacecraft like the recently successful moon probe. Work was Norair's initial bonding effort with titanium, produced solar panel substrates for number of Surveyor spacecraft.

## About That Raise, Girls, Here's a Clue

Northrop Norair secretary Clare Honea has come to the aid of other secretaries who are faced with the dilemma of whether or not to ask the boss for a raise.

Responding to a letter to the editor in "P.S. for Private Secretaries" magazine, Clare advised the letter-writer to "... be certain that you are truly deserving ... be tactful and courteous ... be efficient and orderly."

"If you feel you have done your best at all times and try your hardest, by all means ask for that raise. You deserve it," she said.

Clare, who works in Marketing, isn't saying whether the theory has proven successful for her — but it has paid off. The editors of the magazine sent her \$10 for her answer to the worried secretary's problem.

## July 4 Holiday

Monday, July 4, will be a holiday for all Northrop Corporation personnel in observance of Independence Day. Only those employees notified in advance will be required to work.

## AD ASTRA PER ASPERA

# Titanium Bonds Northrop, Moon

Northrop Norair's initial major work in the bonding of titanium is presently resting on the moon.

Aboard the history-making Surveyor spacecraft that has astounded the scientific world with its precise information on the lunar surface is an aluminum honeycomb sandwich panel with thin titanium skin upon which solar cells are mounted.

This entire component, called the solar panel, is the spacecraft's primary power source, both in flight and during operations on the moon in the lunar day.

Development of the supporting structure, called the solar panel substrate, marked Norair's initial production effort in the bonding of titanium, a material that holds many promises for its strength vs weight ratio, its resistance to corrosion, creep (stretch) and extreme temperatures.

Northrop is an industry leader in developing new techniques in forming, welding, machining, and bonding of titanium alloys. Phases of this work are being carried out in a broad titanium development program centered at Norair.

Manufacturing Research and Development at Norair headed by Barney Gaiennie was responsible for production of the solar panel substrate in a program that began in 1962 and concluded in 1964 with the delivery of the final unit.

George Larsen was Manufacturing R&D project engineer.

This effort was under subcontract to Hughes Space Systems Division, prime contractor for the Surveyor spacecraft, and called for 22 units.

Although titanium is an extremely versatile material with unlimited possibilities, it is also difficult to handle as participants in the Norair program found. For instance, the solar panel substrate's titanium skins are a mere two thousandths of an inch thick. That's only about half the thickness of ordinary writing paper. Its razor-sharp edges were a constant menace. And its pliable nature necessitated the use of material a mere 12 inches wide. For this reason skins were made up of overlapping sheets.

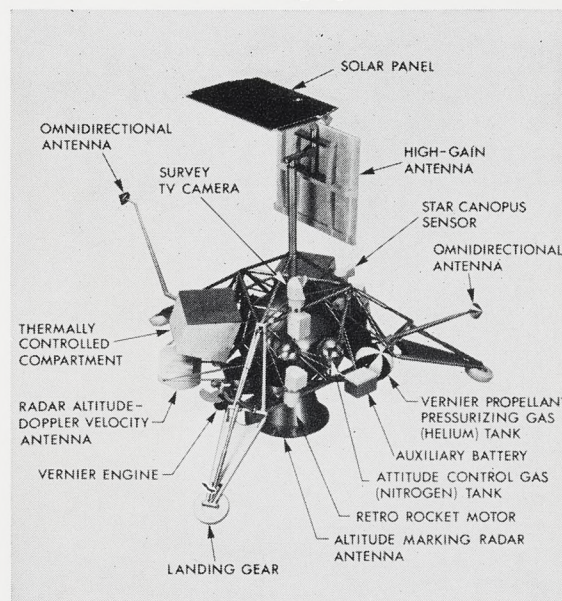
The Norair-produced substrates consisted of the thin titanium skins, honeycomb aluminum interiors and edges made up of hollow microballoons. Together, the unit measured about four feet long, two and a half feet wide and about three-eighths of an inch thick.

Mr. Gaiennie was high in his praise of the Norair Bonding organization for its efforts in this development project.

"They, like Manufacturing R&D, worked without previous experience or guidelines in this work," Mr. Gaiennie said. "The results were obviously worth the effort. And they have been extremely important to us in other programs involving titanium."

Each solar panel substrate was covered with 3960 tiny solar cells grouped in 792 different modules and connected in series-parallel to guard against complete failure in advent of a single cell malfunction.

The Surveyor solar panel is mounted atop a special mast. Wing-like, it folds away during launch. It is deployed by earth-command after the spacecraft has been injected into a lunar trajectory. It then locks onto the sun



Model of Surveyor moon landing vehicle shows location of solar panel (top) as well as other major components which, together, helped record an historic venture in man's conquest of space.

and generates power that is stored in a battery to operate most onboard equipment. In flight the solar panels supply about 89 watts of power. On the moon's surface at temperatures of 140 degrees Fahrenheit, the panels supply 77 watts and at 239 degrees Fahrenheit supply 57 watts.

Launched May 30 atop an Atlas-Centaur vehicle from Cape Kennedy, Florida, the Surveyor spacecraft covered the 247,420-mile trip to the moon in 63 hours. Within minutes of landing it began transmitting pictures of the lunar surface.

## Shelly Speaks in Germany

Northrop's C. P. "Chuck" Shelly will be a principal speaker at the first annual conference of the German Association for Contamination Control meeting this week in Munich, Germany.

He will discuss "Management Approach to Contamination Control."

Mr. Shelly, a Nortronics Hawthorne general supervisor in Operations, is currently serving as national president of the American Association for Contamination Control (AACC), an organization he helped found five years ago and served as a national director (2 years) and executive vice president.

A long-time advocate of international controls on man's contamination problems, Mr. Shelly has been instrumental in helping nations outside the United States form contamination control working groups.

"Our friends in Germany are the first outside the United States to organize an association. They have been active for the past year and have representatives from about 100 industrial firms," Mr. Shelly said. "Sweden is currently contemplating an association."

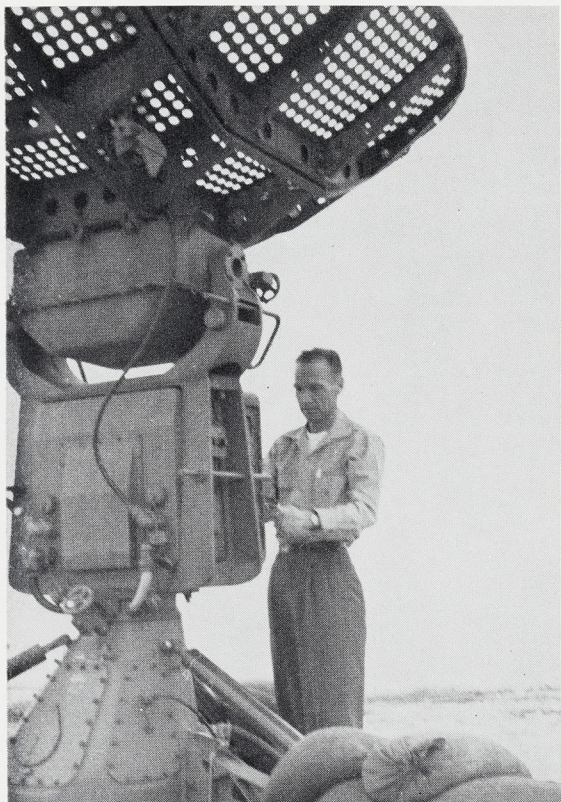
En route to Germany this week, Mr. Shelly stopped off in Boston to preside at a meeting of the National Executive Council of the AACC.

Mr. Shelly's talk, to be presented Friday, is one of several featuring international figures active in contamination control work.

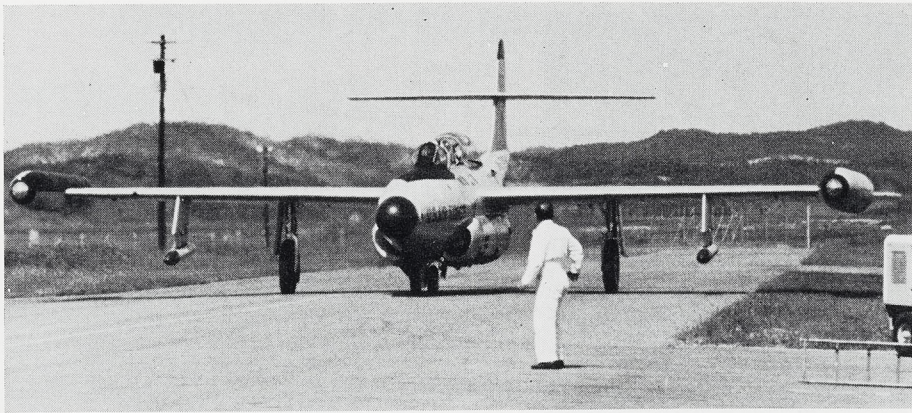


PHOTO OF THE YEAR—This NASA shot of astronauts Thomas P. Stafford and Eugene A. Cernan waving to crew of the approaching USS Wasp could rank as the best yet in the extensive coverage of America's space program. It was shot shortly after their Gemini spacecraft splashed down under a Northrop Ventura Ringsail parachute in the most accurate landing to date.

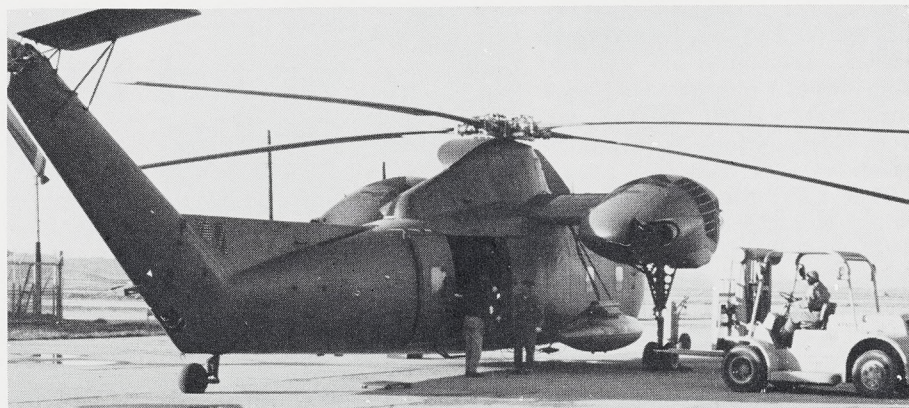
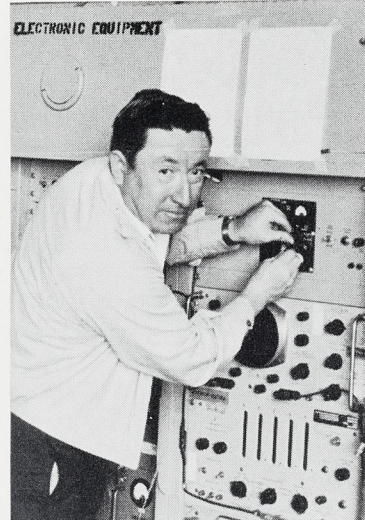




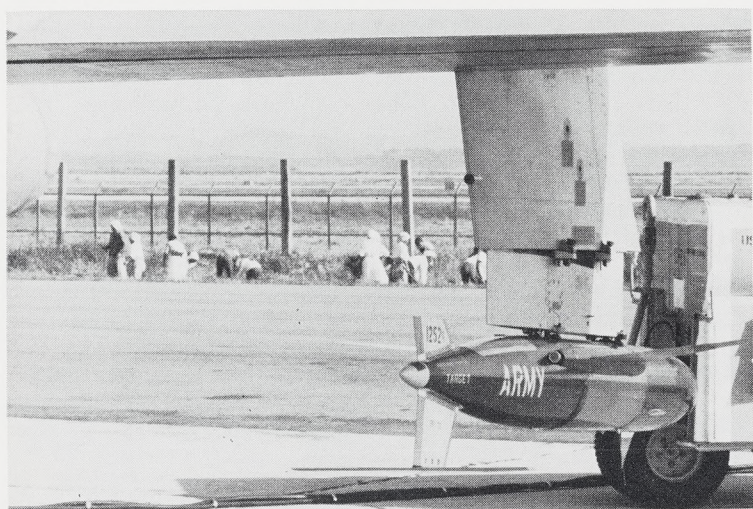
Bob Spies adjusts radar antenna at tracking station prior to launch of AQM-38A target drone. In addition to keeping the radio-controlled drone on its flight path, tracking station coordinates exercise with Army missile battery radar operators.



Four major activities of Northrop Ventura ground support personnel who provide target service to Army missile sites are: aircraft readiness (above), tracking station (right), logistics (below), and target readiness (left).



Back in the tracking station control center, Mr. Spies (right) keeps in touch with missile battery while D. W. Dooley (center) tracking station leadman, sends instructions to F-89 pilot who will launch the drone from 40,000 feet. Field supervisor L. W. Shaw is at left. Koreans (below) harvest grass near runway where F-89, with Northrop Ventura target, waits takeoff order.



## SUPPORTING TARGET LAUNCH

# On the Ground, Things Are Looking Up

In the absence of such tourist publications as "Okinawa on 50 Cents a Day" or "A Guide to Sunken Ships in the South China Sea," ground support crews of Northrop Ventura's Pacific Target Operations have developed an unusual diversity of spare time activities while on the annual 10-month tour of Nike and Hawk missile sites in Korea, Taiwan, Okinawa and Hawaii.

One of them helps a little Chinese boy with his spelling. Two others ship Hondas at their own expense everywhere they go.

Three of them have married while on tour since the program began in 1961.

An electronics buff's leisure time interest in equipment design has led to significant improvements in drone checkout hardware.

Several of the men carry New World culture with them in the form of a stereo record player.

Most all of them are camera bugs.

The work of the 18 men on Pacific duty is related to providing target practice for U.S. Army and Republic of Korea missile batteries, which, once each year, attempt to knock down the Division's AQM-38A supersonic drones.

Formerly designated the RP-76, the drone is propelled by a solid fuel rocket and is air launched from Northrop-built F-89 jets.

Ground support men make up three crews: the target group, aircraft support group and tracking station group. L. W. Shaw is field supervisor, and Rod Hoover in the home office is over-all supervisor of both the Pacific and Panama Canal Zone target operations.

The aircraft support team, under Leadman Mike Cantelmo, is the largest of the three and

*EDITOR'S NOTE: This is the second of two articles on Northrop Ventura's Pacific Target Operations. The first article, which featured pilots of the Northrop-built F-89 jets used in launching target drones, appeared in the August 25, 1965 edition.*

is responsible for keeping the three F-89's assigned to the operation in the air.

In addition to day-to-day maintenance, the men also give the planes a complete overhaul at the end of each year.

The target crew under Leadman C. T. Pulido is charged with unpacking and inspecting each drone, calibrating the instrument package, and installing the bird on the plane.

The tracking station, headed by D. W. Dooley, keeps the radio-controlled drone on its flight path and coordinates the exercise with missile battery radar operators.

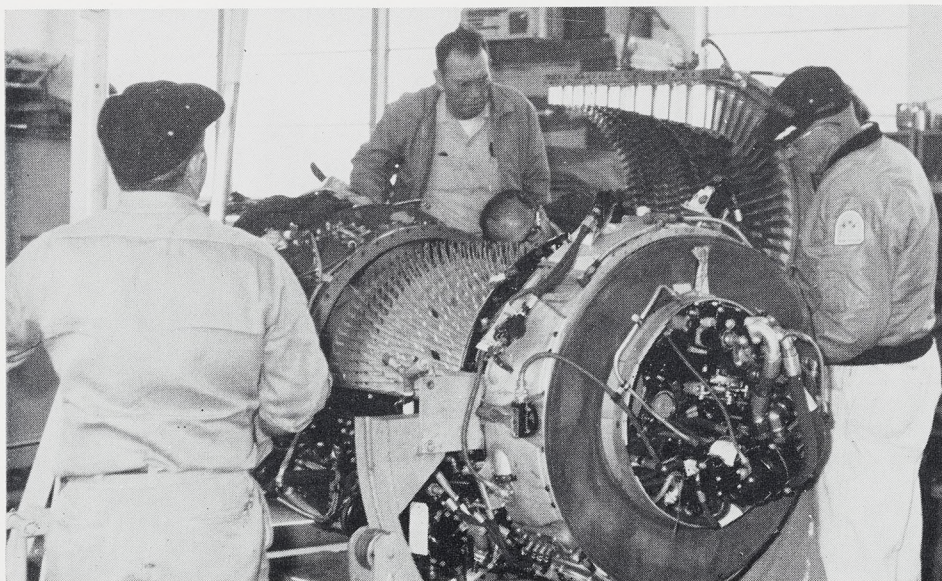
Quality Control is represented on the tour by George Bradley and Robert LaFitte.

Of the 18 men presently on the Pacific tour, six were members of the original 1961 group, including Mr. Shaw, Mr. Bradley, R. E. Spies, H. P. Wright, J. W. Thompson, and J. E. Randall.

It has been five years of steady improvement in the Division's service. The target group has cut in half the time required to prepare a drone. On a good day, the over-all team can send a drone winging to the firing area in 20-25 minutes after the go-ahead is received from the battery.

Complete turnaround of the aircraft, including new drones installed, can now be accomplished in about 35 minutes if required.

One of the biggest headaches of the operation (See PACIFIC, page 5)



L. C. Morris, Bob LaFitte and H. H. Hawley go over F-89 engine at Okinawa. Mr. Morris and Mr. Hawley, members of the aircraft support group, are knowledgeable veterans of Northrop aircraft maintenance through their work at other facilities. Mr. LaFitte is half of the two-man Quality Control team which travels with the ground support crews in the Pacific.



A major activity of the Northrop Ventura ground support crew is logistics, and everyone participates. That's J. W. Thompson, A. W. Honeywell and George Bradley (at left) assisting in loading AQM-38A supersonic target drones on C-120 Globemaster. Aircraft belongs to Military Airlift Command, which transports equipment between target launching sites.



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

# Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

**For Sale**

**Sofa**, contemp. decorator design, sauterne color, 101" width, 2 seat cushions, 4 back cushions, custom made at \$867 cost, delivered new last month, \$450. Bel Air, 472-2571. A

**Chevy II Nova**, 1963, s.s., floor auto., 37,000 miles, \$1500. Harbor City, 325-8932. A

**Boat**, 12' Burchcraft Fisherman, 7½ hp motor, trailer & hitch, \$250. La Mirada, WH 1-1865. A

**Organ**, Thomas elec., 2 keyboard w/foot pedals, has pre-set, making 3rd keyboard, \$550. Redondo Bch., OS 5-4870. A

**Plymouth**, 1955 Belvedere sta. wag., auto. trans., new eng., \$400. L.A., 645-3381. A

**Piano**, maple winter spinet, \$525. Los Alamitos, 213-431-4010. A

**Fish Aquarium**, 15-gal., 2 1-gal. fish bowls, \$7. Bellflower, ME 3-6106. A

**Tires**, Michelin X, 4 near new 6.40 x 13 w/new tubes, 40,000 miles wear remaining, \$100. Huntington Bch., 714-847-2648. A

**Welding Hood**, Huntsman w/lift, #10 lens, used 2 hrs., \$11. Torrance, FR 1-1096. A

**Hi-Fi Console**, Dynaphone radio-phonograph-microphone-amplifier, for elec. guitar, good tone, \$60. Hawthorne, 676-0418. A

**Shotgun**, J. C. Higgins, model 20 12-gauge, r/h, adj. choke, pump action, \$30. Manhattan Bch., 374-5635. A

**Pontiac**, 1957 Chieftain, eng. very good cond., \$175. Torrance, 371-7629. A

**Dirt Bike**, 1964 Dot Scrambler, \$450. Lomita, DA 5-3494. A

**Dinner Ring**, man's, ½ carat blue white diamond set in brush finished mounting, appraised at \$400, \$250. Santa Susana, 805-527-1974. A

**Refrigerator**, 12 cu. ft. Coldspot, white, \$95. Inglewood, 754-8077. A

**Hi-Fi Console**, Hoffman AM-FM tuner, Girard changer, Jensen speakers, walnut cab., \$75. Torrance, DA 8-8797. A

**Surfboard**, Bing, slight nose damage, comp. repair kit, \$40. Hawthorne, 644-2592. A

**Tires**, 2 tubeless 7.50 x 14, w/s/w, for spare or trailer, \$1 ea. Hawthorne, 676-0758. A

**Mobile Home**, 50' incl. 35' cabana, carport, 8' x 8' store room, \$3850. Gardena, 329-5879. A

**VW Micro Bus**, 1962, 28,000 miles, \$1050. L.A., 451-0251. A

**Skin Diving Outfit**, complete, sell separate or \$45. Lynwood, 632-2642. A

**House**, 3-bdrm, 1¼ bath, bltins, dishwasher, fireplace, 2-car gar., \$32,500. Torrance, FR 8-1350. A

**Mercury**, 1959 Montclair, r/h, p/s, p/b, \$385. Inglewood, 674-5445. A

**Chevrolet Impala**, 1962, 327 eng., auto., 2-dr. h/top, p/s, deluxe radio, \$1195. Norwalk, 864-9532. A

**Pilots**, fly Beech Bonanza in Hawthorne Flying Club, \$450. L.A., 479-1198. A

**Lot**, Feather River, West Fork, on paved road, many trees, no dn. pymt., \$10,000. Hawthorne, OS 9-4723. A

**Austin Healey**, 3000 MK III, 1964, wood dash, wire wheels, 4-spd. & o.d., new tires, mufflers, \$2350. Redondo Bch., 379-7567. A

**Porsche 356**, 1953, super coupe, solid bearing crank, 2-pc. case, Porsche brakes, 15" wheels, 16" avail., \$750. Woodland Hills, 346-6675. A

**Boat**, 13½', trailer, 25 hp motor, elec. starter & bait tank, \$450. Inglewood, OR 1-1660. A

**Pontiac**, 1959 Safari wagon, air cond., p/s, low mileage, top rack, \$625. Beverly Hills, CR 6-3534. A

**Motorcycle**, 1965 Ducati 250 cc Scrambler, 1000 miles, extra tire & sprockets, other access., \$595. Hawthorne, OS 6-9736. A

**Motorcycle**, 1965, Royal Enfield, 750 cc, metal flake, chrome plated, \$850. Inglewood, 370-4988. A

**Wiglet hairpiece**, black, used once, 100% human hair, case, cost \$24, \$12. Hawthorne, 644-2130. A

**Volkswagen**, 1956, r/h, w/w, \$625. Covina, ED 1-3940. A

**Clothes Dryer**, \$50. Garden Grove, 638-4916. A

**Mobile Home**, Angelus, 10' x 45', 1-bdrm., front kitchen, alum. awnings, new furnace, \$2850. Gardena, 329-5637. A

**Boat**, 15', fiberglass, elec. start Evinrude 25, lge. wheel trailer, many extras, \$400. Torrance, DA 6-5558. A

**Piano**, Fairbanks, upright, mahogany, new ivory on keys, felt hammer pads & pedals, full keyboard, bench, \$125. Box 1201. A

**Pontiac**, 1957, Star Chief 2-dr. h/top, r/h, p/s, dual range Hydromatic, near new Premium nylon tires, 64,000 act. miles, 1 owner, \$300. L.A., OL 7-3074. A

**Sting Ray**, 1964 coupe, 300 hp, 4-spd. trans., 2.54 low, positraction 3.08, AM-FM radio, p/s, p/b, hard & s/tops, \$3000. Wilmington, 803-1492. A

**Volkswagen**, 1966 sedan, low mileage, walnut dash, spinner wheels, many extras, \$2350. L.A., 276-4543. A

**Surfboard**, Bing, 9'1", \$80. Hawthorne, 644-3487. A

**Bar**, 7' maple w/canopy, lighting, brass rail, bar finish, \$150. Torrance, 835-7780. A

**For Sale**

**Pram**, 8' w/oars, in good cond., \$25. Rolling Hills, 377-5384. A

**MGA Roadster**, 1962, 1600 Mark II, r/h, new engine, \$1200. Port. Bend, 377-8444. A

**House**, 4-bdrm, 2 bath, family room, bltins, fully landscaped, 5% dn., \$23,975. Thousand Oaks, 805-495-7927. A

**Range**, gas, \$50. Hawthorne, OS 5-7965. A

**Rug**, oval, wool, hooked-type, approx. 9x12, predominantly green, \$40. Fullerton, 714-626-1521. A

**Camera**, Argus, mod. C3, incl. flash attach., case, & light meter, Argus, \$22. Torrance, 328-5655. A

**T-Bird**, 1956, h/top, silver gray, fresh o/haul, paint & tires, auto. trans., orig. owner, \$1100 or best offer. Pacific Palisades, 454-2057. A

**Poodle**, miniature, silver gray, male, AKC, 2 yrs. old, needs good home, \$30. Gardena, DA 3-7244. A

**Porsche**, 1953, convt., 1500 super, new top, eng. needs work, 4-spd. synchromesh trans., \$250. Downey, 923-1521. A

**Land**, 20 acres near Willow Springs, Antelope Valley, East Kern water dist., \$495 acre. Torrance, FR 8-1026. A

**Falcon**, 1963, 2-dr., 6 cyl., auto. trans., r/h, \$925. Inglewood, OR 4-1654. A

**Volkswagen**, 1965 Squareback, 1500 sedan, \$1800. Fullerton, LA 6-6759. A

**Honda 90**, less than 400 miles, \$285. Hawthorne, OS 6-3912. A

**Encyclopedia Set**, 1958 Britannica, w/case, \$90. Hawthorne, OS 5-7729. A

**Motorcycle**, 1956 Triumph chopper, \$500. Redondo Bch., FR 1-3964. A

**House**, 3-bdrm, 2-bath, lge. covered patio, bltins, 5¼% mortgage, \$141 mo. pymt., \$27,500. Torrance, 325-0039. A

**House**, 3-bdrm, 2-bath, 2-car gar., 12'x24' encl. patio, 10% dn., will finance, near Norair, \$27,500. Torrance, 327-3160. A

**Ford Galaxie 500**, 1959, 8-cyl., p/s, r/h, 2-dr. h/top, \$350. Hawthorne, 675-5057. A

**House**, 2-story, 4-bdrm., den, 2-bath, fences, 2 patios, used brick landscaping, GI, \$23,500. Simi, 805-526-5365. A

**Chevrolet**, 1959 Bel-Air, auto. trans., p/s, new tires, \$225. Inglewood, OR 3-2840. A

**Wall Heater**, Mission Sunair, 8750 btu output, like new, \$25. Hermosa Bch., FR 4-1889. A

**Chevrolet**, 1958, station wagon, r/h, p/s, w/s/w, \$350. Rolling Hills, FR 5-5761. A

**Steel Sprockets**, new hardened, ½" pitch, ¾" & 1" bore, 20 & 40-tooth, 5/8" bore, 25-tooth w/hub, ¾" bore, 32-tooth w/hub, \$1.49 ea. Inglewood, 674-3953. A

**Outboard Motor**, 5 hp, used very little, cost over \$200. \$50. Torrance, FR 5-2929. A

**Runabout**, 16' fiberglass w/steering assembly, 6' beam, 2½' freeboard, foam bilge, glass laminate floor, \$175. Box 1202. A

**Dresser**, 6-dwr., Danish walnut, \$40. Torrance, 375-2018. A

**Refrigerator**, Westinghouse, crosstop freezer, \$35. Hermosa Bch., 374-5425. A

**House**, 3-bdrm., family rm., elec. appliances, sprinklers, block walls, 1700 sq. ft., near Fashion Square, \$28,900. Santa Ana, 633-3657. A

**Pistol**, .22 cal. repeater, Belgian Melior, \$50. Hawthorne, OS 6-0637. A

**Washer**, \$45. L.A., 645-5169. A

**Honda**, 50cc, C-102 street bike, 1965 new elec. starter, windshield, mirrors, \$200. Inglewood, 754-3946. A

**Train**, 3/16 American Flyer, 5 switches, 53 pl. track, 2 locos, 8 cars, other access., \$30. Fullerton, 714-871-4775. A

**Mobile Home**, 12x55, extended living rm., kit, Golden State, furn., lots of extras, \$10,500. Anaheim, 525-2617. A

**Dishwasher**, RCA delux bltin, yellow, \$125. Anaheim, 524-1728. A

**Home**, 3-bdrm., family rm., 1¼ bath, lge. covered patio, sprinklers, dishwasher, forced air heat, 1 mile from San Diego Fwy., \$24,900. Garden Grove, 893-8721. A

**Square Dancing Dress**, ladies' size 12, blue & white checked gingham, worn once, \$8. Hawthorne, OS 9-6334. A

**FM Tuner**, Metronome, fruitwood cabinet, \$5. Torrance, 323-8089. A

**Crib w/mattress**, \$15. Inglewood, 674-6395. A

**Chevrolet**, Greenbrier, 1964, 3-seat, 4-spd. trans., delux mod., new tires, \$1800. Malibu, GL 6-2559. A

**Cabin Cruiser**, 28', nearly complete, Grey marine eng., sleeps up to 6, galley area, \$1500. Anaheim, 827-4501. A

**Boat**, 14' glass catamaran power cat w/35 hp elec. start Mercury engs., cust. cover, 2 extra props, trailer, \$800. Gardena, 675-2331. A

**Cushions**, complete set, for 10' Alaska camper, \$30. Hawthorne, OS 9-6449. A

**Ford Fairlane**, 1957, V-8, auto. trans., \$300. Hawthorne, 644-3501. A

**Chevrolet**, 1957, 4-dr., V-8, stick shift, glass pak mufflers, \$275. Torrance, 375-0165. A

**Pups**, weimaraner, show quality, AKC registered, \$100. Rolling Hills, 377-1281. A

**Chevrolet**, 1961 4-dr. sedan, auto. trans., 6 cyl., r/h, \$550. Inglewood, 678-1621. A

**For Sale**

**Lot**, 80'x100', at Snow Summit Estates, Big Bear Lake, 1 block from ski slope, \$6950. Fullerton, 525-1677. A

**House & duplex**, room to build, near Auto-netics & Nortronics, will take 2nd T.D., \$30,000. Brea, 528-4553. A

**House**, 2-story, 4-bdrm., 2-bath, fireplace, near school & golf course, \$27,500. Torrance, 375-6071. A

**Range**, gas, RCA Wedgewood, 36" deluxe chrome top, \$50. L.A., AX 4-0465. A

**Pups**, collie, 5 wks. old, AKC show quality, males & females, \$75 & up, Simi, 805-526-8674. A

**Diamond Wedding Ring Ensemble**, orig. cost \$200 set, size 7, \$100. So. Gate, 566-1670. A

**Duplex**, 1 block from Norair, 3-bdrm., 1½ bath, bltins, dishwasher, fireplace, plus apt., 1-bdrm., 2½ yrs. old, \$32,500. Hawthorne, 679-1307. A

**Coffee Table**, mahogany, glass top, \$8. Inglewood, OR 7-5276. A

**House**, 4-bdrm., 2-bath, family-bk. bar, bltins, fireplace, insul., sprinklers, many extras, 2250 sq. ft., 1½ yr. old, \$2700 dn., in Dominguez, \$30,000. Compton, 632-4978. A

**Wet Suit**, 3/16 rubber, h. d. zippers, hood, size 40-42, mask, & accessories, complete, \$50. Torrance, 323-4257. A

**Oldsmobile 88**, 1955 4-dr. Holiday sedan, r/h, p/b, p/s, auto. trans., good tires, \$200. P.V. Pen., 377-5907. A

**House**, 4-bdrm., family rm., 2½ baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

**Motor Scooter**, Lambretta, 150 cc, 1962, 10,000 mi., sound mech. & tires, \$250. Anaheim, 776-1023. A

**Jaguar**, 1963, auto., radio, p/s, 34,000 miles, \$2500. Corona Del Mar, 673-7258. A

**Trailer**, Globe, 13½', sleeps 4, fully equipped, \$500. Gardena, 673-0995, 671-8413. A

**House**, 4-bdrm., 1¼ bath, bltins, service porch, G.I. 5¼% loan, \$36,500. P.V. Pen., 378-0120. A

**Refrigerator**, Frigidaire, 18 cu. ft., frost-free, bottom freezer, yellow, \$200. Harbor City, 326-1856. A

**Bedroom Set**, dble. bed, spring & mattress, hi-boy dresser, vanity & chair, \$50. L.A., AX 2-3445. A

**Washer**, wringer-type, \$25. S. Gate, ME 3-2395. A

**Speaker System**, stereo, 4 speakers, 2 encls., ea. side has 10" freq., flexedge, Woofer w/cambic suspension, 3" wide dispersion, many extras, \$75. Wilmington, TE 5-9070. A

**Mobile Home**, 10'x50', birch paneled int., fenced patio w/40' lg. awning, lge. rms., ocean view, low space rental, \$4950. Pac. Palisades, GL 4-3642. A

**Oldsmobile**, 1963 Super 88, 4-dr. h/top, factory air, r/h, p/s, p/b, p/w, new tires, \$1985. Redondo Bch., FR 2-8502. A

**Chevrolet**, 1959, 2-dr. business coupe, no rear seat, \$75. Manhattan Bch., 374-2006. A

**Pontiac**, 1960, Bonneville, sta. wag., p/s, p/b, auto. trans., r/h, new tires & brakes, 52,000 orig. miles, \$850. Orange, 633-4378. A

**Home**, 5-bdrm., 2-story, 2500 sq. ft., family rm., sep. dining, 3 baths, prof. landscaping w/sprinkler system, 2 yrs. old, 10 minutes from Anaheim facility, \$37,500. Orange, 714-633-2406. A

**Movie Camera**, Jelco 8-EC-1, 8mm cine, 3 turret lenses, bltin exp. meter & filters, trigger pistol grip & leather carrying case, \$35. P. V. Ets., FR 7-2294. A

**Surfboard**, Bragg 8'11" long, wgt. 22½, 3½" thick, clear deck, cus. finish, \$65. Hermosa Bch., 372-6755. A

**Air Conditioner**, (auto), Mark IV & compressor w/9-blade thermo-fan, brackets to fit 1960 V-8 Chevrolet, \$150. Placentia, 528-5006. A

**Awning for camping**, lge. orange & white nylon, complete w/center pole, nylon ropes, & stakes, \$15. Box 1203. A

**Home**, 3-bdrm., lge. den, low down, 1st mort., taxes & insur. approx. \$150 mo., \$21,900. Gardena, DA 9-2904. A

**Guitar**, Guild elec., single pickup, cost \$175; \$75. Fullerton, 879-2857, LA 5-9633. A

**Home**, 3-bdrm., 1½ bath, dishwasher, lge. covered patio, 18'x20' sep. rumpus rm., block walls & planters, terrace, tropical landscaping, fruit trees, walk to Northrop, easy terms, \$25,500. Hawthorne, OS 6-8842. A

**Amateur Equipment**, Gonset G66B BC thru 10 meter receiver & G77B 80 thru 10 meter transmitter, plus power supplies, \$90. Panorama City, 894-3244. A

**For Sale**

**Piano**, bench, upright, oak finish, recond. by Penny-Owsley, \$175. Torrance, FR 5-8804. A

**Acreage**, 4 40-acre parcels, 18 mi. to Lake Isabella, mtn. timber, 10% down, \$220 to \$420 acre. Redondo Bch., FR 4-2945. A

**Ford**, station wagon, 1959, new paint, runs well, \$500. Inglewood, EA 2-5068. A

**Home**, near Norair, 3-bdrm., family rm., fireplace, will carry loan, \$24,500. Gardena, OS 5-4354. A

**MGTD**, 1952, excel. cond., \$400. Gardena, FA 1-1186. A

**Pontiac Catalina**, 1960 convt., new top, brakes & battery, \$795. Box 1204. A

**Volkswagen**, 1966, 1600 Fastback, just delivered from Germany, 185 miles, w/s/w tires, \$2495. Inglewood, 673-1589. A

**Chevy II**, 1962 Nova convt., auto., b/seats, \$980. Venice, 823-2701. A

**Chrysler Imperial**, 1954, full power, \$375. Torrance, DA 9-8996 before 3:15 p.m. A

**Dinette Set**, 7-pc., in good cond., \$35. Hawthorne, 675-0407. A

**MGA**, 1956, new top, & 2 tires, radio, \$375. P. V. Ets., 378-5944. A

**Falcon**, 1960 Ranchero, good cond., \$575. Gardena, DA 9-9046. A

**Guitar**, Spanish Fender Malibu, w/case, cost \$180; \$135. P. V. Pen., FR 8-2810. A

**Tape Recorder**, Akai, 2 speakers, 2 microphones, \$350. Inglewood, OR 1-1351. A

**Home**, 3-bdrm., 1½ bath, lge. living rm., fireplace, sep. dining rm., 17'x34' swim pool w/heater, near schools, churches, will carry 2nd, \$29,500. Gardena, DA 4-1631. A

**Bed**, modern, dble., w/walnut head & foot boards, box springs & mattress, \$40. L.A., 671-0122. A

**House**, 2-bdrm., white frame, fenced, ¾ acre, shade trees, 10 citrus trees, near Elsinore, lake view, \$10,700. Torrance, DA 4-5422. A

**Bath-a-net**, near new, \$15. Gardena, DA 9-3436. A

**Ford Galaxie 500**, 1965, r/h, p/s, factory air cond., 15,000 miles, \$2395. Long Bch., GA 3-1633. A

**Wanted to Buy**

**Tape Deck**, monaural, prefer Heath or other high quality unit. Rolling Hills, 325-3057. B

**Bedroom Set**, prefer without mattress & box springs. Inglewood, OR 2-4486. B

**Valiant**, 1963, auto. trans. Gardena, 323-5685. B

**Engraver Machine**, copy type masters for pantograph. Gardena, OS 5-5258. B

**Typewriter**, good used, standard carriage, late model. P.V. Pen., 377-8812. B

**Mandolin**, must be good condition, prefer Martin or Gibson. Culver City, VE 9-5438. B

**Desk**, dble. pedestal, wooden, in good condition, reasonable. Fullerton, 879-1447. B

**FREE (To Be Given Away)**

**Kittens**, 6, want good home. Hawthorne, 679-6581. D

**Rentals Offered**

**Apt.**, 2-bdrm. & 4-bdrm., near bay & beach, make reservations, avail. June, July & Aug., 4-bdrm. June & July, \$125 & \$200 wk. Inglewood, 672-3764. E

**Apt.**, 3-bdrm., 2 baths, \$165 mo. L.A., WE 5-4006, WE 5-9148. E

**Apt.**, 1 or 2 bdrm., furn. or unfurn., heated pool, near Norair, \$105 & up. Ventura, 321-0928, 805-642-5405. E

**Apt.**, 2-bdrm., gar., disposal, small yard, 5 mins. to Northrop, \$95 mo. Hawthorne, 325-5705. E

**Apt.**, 2-bdrm., unfurn., lge. closets, bltins, closed gar., laundry fac., adults only, no pets, \$125 mo. Torrance, 375-1645. E

**Apt.**, unfurn., 1-bdrm., bltins, incl. refrig., laundry fac., gar., 15 minutes to Northrop, adults, avail. July 1, \$90. Redondo Bch., 379-4628. E

**Apt.**, deluxe 1-bdrm., pool, bltins, \$95 mo. Redondo Bch., 376-2117. E

**Cabin**, Green Valley Lake, \$35 weekends; \$60 wk. Torrance, 320-2002. E

**Vacation Cabins**, Lake Gregory & Crestline, make reservations early for June thru Sept., \$25 weekends, \$60 wk. Venice, EX 1-2040. E

**Vacation Cabins**, Idyllwild, stream, patios, secluded, \$25 w/end, \$50 wk. & up. L.A., PL 4-5288. E

**Bachelor Apt.**, furn., 2 blocks from ocean, sep. bldg., no pets, no overnight guests, \$100 mo. Hermosa Bch., FR 6-1636. E

## Going my way?

**Rides Wanted**

**7:30 a.m. — 4:15 p.m.**

**Hawthorne Blvd. & Rosecrans at 139th**, Hawthorne. Julie Borrego, Norair, ext. 4388. 3

**8 a.m. — 4:45 p.m.**

**Orange & Del Amo**, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 5

**Figueroa & Anaheim**, Wilmington. Tom Henrich, Norair, ext. 2425, 835-9070. 5

**Venice & Sepulveda**, Los Angeles. Sheldon Ossoff, Norair, ext. 1016, 837-2916. 5

**Rides Offered**

**8 a.m. — 4:45 p.m.**

**Orange & Del Amo**, Long Beach. W. H. Covert, NSL, ext. 2721, GA 3-1363. 15

**Venice & Sepulveda**, Los Angeles. Sheldon Ossoff, Norair, ext. 1016, 837-2916. 15

**Rentals Offered**

**Apt**, unfurn., 1-bdrm. & 1-bdrm. studio, 3 blocks from King Harbor, piped music, bltin vacuum, gar. storage, \$105 up. Miraleste, TE 3-9862. E

**Room** in bachelor home, house privileges & all utilities pd., \$60. mo. Box 1205. E

**Apt.**, unfurn., 2-bdrm., 2-bath, air cond., dishwasher, pvt. balcony, children's play-yard, \$155 mo. Inglewood, FR 5-0867. E

**House**, 3-bdrm., air cond., 2-car gar., lge. yd., dishwasher, in Lakewood, \$160 mo. Cypress, 714-828-9076. E

**Apt.**, 2-bdrm., unfurn., garage, \$105. Redondo Bch., FR 2-5310. E

**Apt.**, 2-bdrm., bltins, garage, near So. Bay shopping center, \$110. Redondo Bch., 374-5879. E

**Apt.**, 2-bdrm., lower unit, stove, bltins, 2 blks. from Norair, avail. July 1, \$115 mo. Hawthorne, OS 6-7417. E

**Apt.**, furn., single, 1 block from Northrop, gar. & utilities furn., \$80. Hawthorne, 675-6481. E

**Apts.**, deluxe, furn or unfurn., 2 & 3 bdrm., bltins, carport, storage space, hot water & trash pd., near Norair, \$140-\$175 mo. Hawthorne, 679-1358. E

**Apt.**, 'girl wanted to share 2-bdrm., furn., util. pd., in Hollywood, \$65. mo. Alhambra, AT 4-5698, HO 4-1084. E

**House**, 3-bdrm., completely furn., garbage disp., dble. gar., within walking distance of Northrop, \$200 mo. Gardena, 324-0730. E

**Lost**

**Ring**, silver w/single pearl inset, much sentimental value to owner, reward for recovery & return. Call Lost & Found, ext. 1972 or L.A., 931-6759. J

**Personals**

In deepest appreciation of the many lovely cards & flowers sent in memory of our husband & father, Donald McCulloch. MRS. LOUISE MCCULLOCH & SONS. L

I wish to thank all my friends at Nortronics Anaheim for the beautiful flowers & expressions of sympathy for my family & myself upon the death of my father, Clarence V. Striegel. ROBERT L. STRIEGEL. L

**Share** my home or rent lge. bdrm. w/½-bath, pvt. entrance, kitchen privileges, 1 mile from Norair. Hawthorne, 676-8833. L

**Share** driving & expenses to Pittsburgh, Penna., leaving on or around June 24, return by July 18. Hawthorne, 675-9540. L

We wish to express our deep appreciation for your kind sympathy during the passing of my father. MR. & MRS. JACK SANTICH. L

To our many friends & co-workers, my wife & I extend our heartfelt thanks & our appreciation for the wonderful retirement party on June 9, 1966 & for the many beautiful gifts. D. S. (SCOTTY) & ANITA FIELD. L

I wish to thank all for the many expressions of kindness during Nita's illness & passing. TED CORLEY. L

**For Sale or Trade**

**Triumph TR-3**, convert., 1959, low mileage, excel. mechanical cond., \$500 or trade for full-sized car. W. Covina, PL 6-2587. M

**Campers Change Name**

Olive Carmichel is the winner of an NRC Camping Club contest to select a new group name. The name: Northrop Wanderers.

**FDR BOUGHT FIRST**

This year marks the 25th or Silver Anniversary of U.S. Savings Bonds. The first Series E bond was sold to President Franklin D. Roosevelt on May 1, 1941.

## PACIFIC: Five Years of Improvement

(Continued from page 4)

tion, transporting equipment from site to site, has also been alleviated considerably through innovations in both packaging and reduction in size of some of the electronic equipment. More than 32,000 pounds of cargo is carried, exclusive of the targets themselves.

The target group today requires about eight boxes, compared to 38 five years ago. The tracking group has reduced its gross weight

shipments by 1600 pounds in the same period.

(Transportation of equipment is handled by the Military Airlift Command. The Air Force also lends a hand in providing fuel and facilities for the F-89's aircraft.)

A separate crew, ranging from 10 to 14 men, provides the same target service for U.S. Army units in the Panama Canal Zone. Headed by R. W. Legg, the groups use El Paso as a staging and supply area.



## NRC CALENDAR

For information on all NRC activities call: Norair, ext. 2486; Nortronics-Hawthorne, ext. 301; Nortronics - Palos Verdes, ext. 441; and Nortronics-Anaheim, ext. 244.

**BALLROOM DANCING** — Classes at 7:30, 8:30 and 9:45 p.m. each Thursday, NRC Clubhouse, Hawthorne. Cost: \$5 per person for 10-week course.

**BOAT CLUB—POWERED** — Meets at 7:30 p.m. fourth Wednesday, NRC Clubhouse, Hawthorne. Outings at frequent intervals.

**CAMPING CLUB**—July 4th weekend trek to Oak Springs (near Hemet). Full schedule of events. No reservations needed.

**FISHING** — NRC-sponsored charters 1:45 a.m. fourth Saturday from 22nd St. Landing, San Pedro, aboard "Truth." Cost \$16 per person, reservations at Norair Personnel Activities.

**MODEL AIRPLANE** — June 27 meeting at 7:30 p.m., NRC Clubhouse, Hawthorne, will feature Cliff Weirick, 1965 national radio control flying champion.

**MUSICAL ENSEMBLE** — Musicians interested in forming classical or chamber music group, contact Janet Photinos, ext. 1712 at Norair.

**SQUARE DANCE**—Luau at 8 p.m., June 24, Hill Rancho, 15701 Crenshaw, Gardena. Izzy Weston caller, food, prizes, show.

**TOASTMASTERS** — Meet at 6:30 p.m. each Thursday, Norair cafeteria.

**TRAVEL** — Around-the-world tour (Sept. 2 through Oct. 4) meeting at 7:30 p.m. June 29, NRC Clubhouse, Hawthorne. Films, questions and answers, tour information.

## COMBAT

(Continued from page 1)

dian border in support of American ground troops.

Colonel Segura remarked: "I was very fortunate to be able to draw from the vast amount of knowledge and experience gained by the pilots assigned to the 10th FCS who have been flying the F-5 in combat for over six months."

Colonel Segura described the F-5 as "outstanding, extremely maneuverable, simple to operate and highly reliable. It is a fighter pilot's airplane."

Command of the 10th FCS shifted recently to Lieutenant Colonel Robert F. Titus, a veteran combat pilot and former Air Force test pilot.

Colonel Titus was assigned to the 10th FCS temporarily last November and in less than a week chalked up 10 combat strikes in the F-5. Among his many other distinctions are having been the first Air Force pilot to make a zero launch takeoff in the F-100, participation in the first two-plane, single-jet fighter flight over the North Pole, extensive time in testing new aircraft for the Air Force at Edwards Air Force Base, and 101 combat sorties flown in Korea.

## GEMINI

(Continued from page 1)

municators on the WASP were talking with Stafford and Cernan in the descending spacecraft and at the same time vectoring out the recovery helicopters and frogmen who would attach a flotation collar around the spacecraft moments after landing.

## EXPLORERS' CHARTER



Aerospace Explorer Post 1962, sponsored by Nortronics Palos Verdes, received its official charter recently from the Boy Scouts of America. Ross Miller, vice president—technical, presents the charter to Bruce Cooke, Palos Verdes High School senior. Advisor for Post 1062 is Gordon E. Click. The first unit project, now underway, is the design and production of a sun tracking system.

## Versatile Ordnance Pod Earns Plaudits of Users

"Accurate . . . reliable . . . durable . . . easy to maintain and operate . . ."

Northrop Norair's versatile SUU-20/A Bomb and Rocket Dispenser has earned these plaudits and many more during a busy 18-month period.

In this time SUU-20/A's have been put through intensive test and evaluation, served in combat crew training of United States and allied pilots, including those who carried out the "Skoshi Tiger" program in Vietnam, and have been introduced into equipment inventories of two allied nations.

The SUU-20/A is a portable ordnance dispenser that carries six practice bombs and four rockets in a single unit. It is designed to be mounted on virtually any current make of fighter aircraft. It can be flown supersonically.

The SUU-20/A has successfully completed an extensive Air Force evaluation and qualification program which encompassed aerial firings and environmental testing such as vibration, heat and cold soak, and salt and sand spray. In one phase, over 500 rockets were fired from a single unit without a malfunction.

Norway and Iran acquired quantities of the SUU-20/A direct from Northrop Norair for use in their respective training programs at home.

And pilots from other allied nations scheduled to receive the F-5, who trained with SUU-20/A units at Williams Air Force Base, have been so high in their praise for the system that several nations have requested and will soon start receiving SUU-20/A units which will be supplied as part of the Military Assistance Program.

## NRC Slo-Pitch Softball Hits Popularity Peak

Slo-pitch, a form of softball introduced to Southern California only a few years ago, has reached a popularity peak this year in Northrop Recreation Club play.

That's the word from Mac McConnell, who is serving his second year as softball commissioner at Hawthorne. He was commissioner in 1963.

The NRC is sponsoring two slo-pitch leagues this summer. One, a six-team league which uses a 12-inch ball, plays on Wednesday nights and Saturday mornings.

The other, a four-team league using a 16-inch ball, plays on Tuesday nights.

Games are played at Alondra Park in Lawndale and Eucalyptus Playground in Hawthorne.

"Slo-pitch is becoming more popular each year," Mr. McConnell said. "With all the different businesses, church groups and other organizations sponsoring slo-pitch, sometimes it's difficult finding enough fields for conventional softball."

Slo-pitch differs from regulation softball in several ways. Both the 12-inch and 16-inch slo-pitch leagues employ the same rules.

Where baseball and softball have nine men in the field, slo-pitch has 10. The tenth man, the short fielder, is a fourth outfielder, generally playing between the left fielder and center fielder, just behind the infield.

There is no base-stealing in slo-pitch, and pitching is done in an arc trajectory, so the ball is coming down as it reaches home plate.

Mr. McConnell said many of the slo-pitch teams have player openings.

"Some of the teams don't have full rosters yet," he said, "and vacations are coming up soon. That will leave even more positions open." All teams have 15-man rosters.

Three of the four 16-inch slo-pitch teams are composed primarily of Nortronics employees. The fourth is a Norair team.

Five of the six 12-inch teams are made up of Norair workers,

and the sixth includes mainly Nortronics personnel.

Teams and managers in the slo-pitch program are:

Sixteen inch—Computers, Raul Ortiz; Softwares, Vic Garcia; Johnson Jets, Lou Villalba; and Vigilantes, Gary Wykoff.

Twelve inch—No Sox, John Crayton; Chevez Regals, Al Larson; F Troop, Chuck Fortier; Rogues, Lou Colombano; Charlie's Gang, Ray Pino; and Batmen, Rube Cline. F Troop is composed largely of night shift personnel, so its games are played on Saturdays.

Further information may be obtained by calling Tom White in Personnel Activities, ext. 2486.

The regulation softball program includes three teams this season, Mr. McConnell said.

The Talons, a team of Norair employees, play on Tuesday nights. Jose Ojeda is manager.

The Jets, also a Norair team, play on Wednesdays. Mr. McConnell is manager.

The Hawks, a Nortronics team, play on Thursdays. Larry Beuder is manager.

The Talons and Hawks still have player openings, Mr. McConnell said. He may be contacted at ext. 2484.

The softball teams, which play at Alondra Park, are in open Los Angeles County leagues this summer. They'll play through August.

The Northrop softball program will end this summer with an interplant playoff at the Pomona Fairgrounds on August 27, the day of the Northrop summer picnic at the fairgrounds.

## L.A. HARBOR HOSPITAL PRESENTS AWARD FOR EMPLOYEE SUPPORT

An "Award of Merit for Outstanding Achievement" has been presented Corporate, Norair and Nortronics personnel by the Los Angeles County Harbor General Hospital.

This honor, presented at a recent recognition night dinner, recognized the outstanding support of Northrop employees to the hospital and its patients over the last year-end holiday season.

In addition to a cash gift of almost \$500, Northrop employees collected two truck loads of assorted gifts, presents and equipment to be used by the hospital and its patients. This was a part of the annual Northrop attention to others less fortunate at Christmas time.

Marie Tully, Norair Welfare administrator, accepted the award on behalf of all employees from Gerald G. Bosworth, assistant administrator at Harbor General.

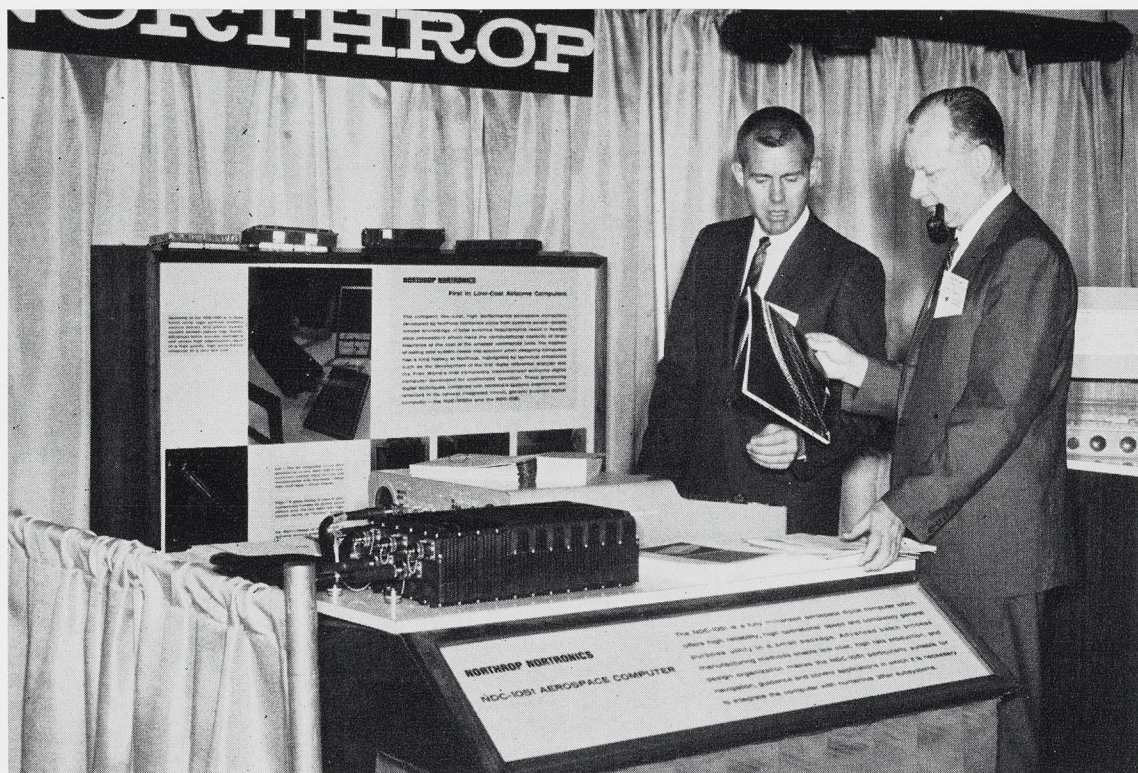
## Gift to Cancer Fund Made in Moss' Name

Northrop Nortronics friends of Ben Moss have made a special contribution in his name to the American Cancer Society.

Mr. Moss, formerly of the Field Engineering organization, died early this month. He is survived by his wife, a daughter and a son.

With Nortronics for the past six years, Mr. Moss worked at Norair for more than 18 years, primarily as an electrical and installation planner. He would have completed his 25th year with Northrop next December.

## NO MERE SHOWPIECES, THESE



Nortronics Digital Computers (1051 in foreground, 1050 at right rear) were hits at recent National Aerospace Electronics Conference at Dayton. Nortronics' NDC-1051 solved fault tests for visitors like gentleman at right talking with

Bert Swearingen, chief of Advanced Computer Systems. Other booth workers, who reported widespread interest in NDC-1051 compact packaging and low cost, were Ed Klein and Walt Edwards.



## Tests Prove TEAMS Unit Reliability

Northrop Nortronics' initial TEAMS system has emerged from the first phases of an extensive verification program with flying colors and has plunged into another gruelling series of tests scheduled to extend into the fall months.

TEAMS (Tactical Evaluation and Monitoring System) is the newest application of Northrop's DATICO concept of automatic testing. It has been ordered by the Navy's Bureau of Ships for use aboard a new class of destroyer escort.

TEAMS is destined to become the Navy's fastest troubleshooter — an automatic checkout system designed to keep tabs continuously on as many as 10 major on-board electronic systems. In its initial role TEAMS will monitor four crucial combat systems, sonar gear, fire-control radar and two search radar units.

Northrop's first TEAMS, a preproduction model, made its debut early this year. At Nortronics Anaheim production is now under way on the first production models of more than a score ordered by the Navy.

An extensive service test program scheduled for the preproduction model is progressing smoothly and in all tests to date TEAMS has met or exceeded all requirements set for it, according to Program Manager W. P. Van Ordstrand.

Nortronics fabricated a special display fixture to conduct tests on TEAMS' important fault isolation capability. It enabled participants and observers to visually trace, via a series of lights, each step TEAMS was taking in first determining a fault then in pinpointing its exact location.

Repeatability tests showed TEAMS can conduct the same series of tests over and over without deviation from initial findings. In quickly taking more than 2200 sensor measurements on a number of tests.

(See TEAMS, page 6)

## A TRI-SERVICE EFFORT

### Ted Parker to Head TIPI Organization

The Tactical Information Processing and Interpretation (TIPI) program will be headed by Ted Parker, a 10-year Northrop veteran.

The announcement was made by Fred Stevens, Corporate vice president and Nortronics general manager.

TIPI is a joint effort of all United States military services to develop an intelligence system that will provide military commanders with faster and better battlefield information.



Mr. Parker

The Nortronics team, headquartered at

Anaheim, is providing systems engineering and technical direction for the over-all program under terms of a \$4.1 million contract.

In addition to Mr. Parker, key positions in the Nortronics TIPI organization are filled by: Dr. Gene Blount, administration; Pete Kolosky, program control; Bob Hohl, operational requirements; George MacDermut, resident engineering at Wright Patterson; and Jim Lynch, systems engineering.

Key persons in Mr. Lynch's group are: Lou Vettese, systems design; Gil Stockwell, computer software; Don Moss, process and interpretation; and Lee Hausman, intelligence data handling.

Basic objective of the TIPI program is the development of

field intelligence processing units designed to help military services keep pace with modern aerial and surface reconnaissance equipment.

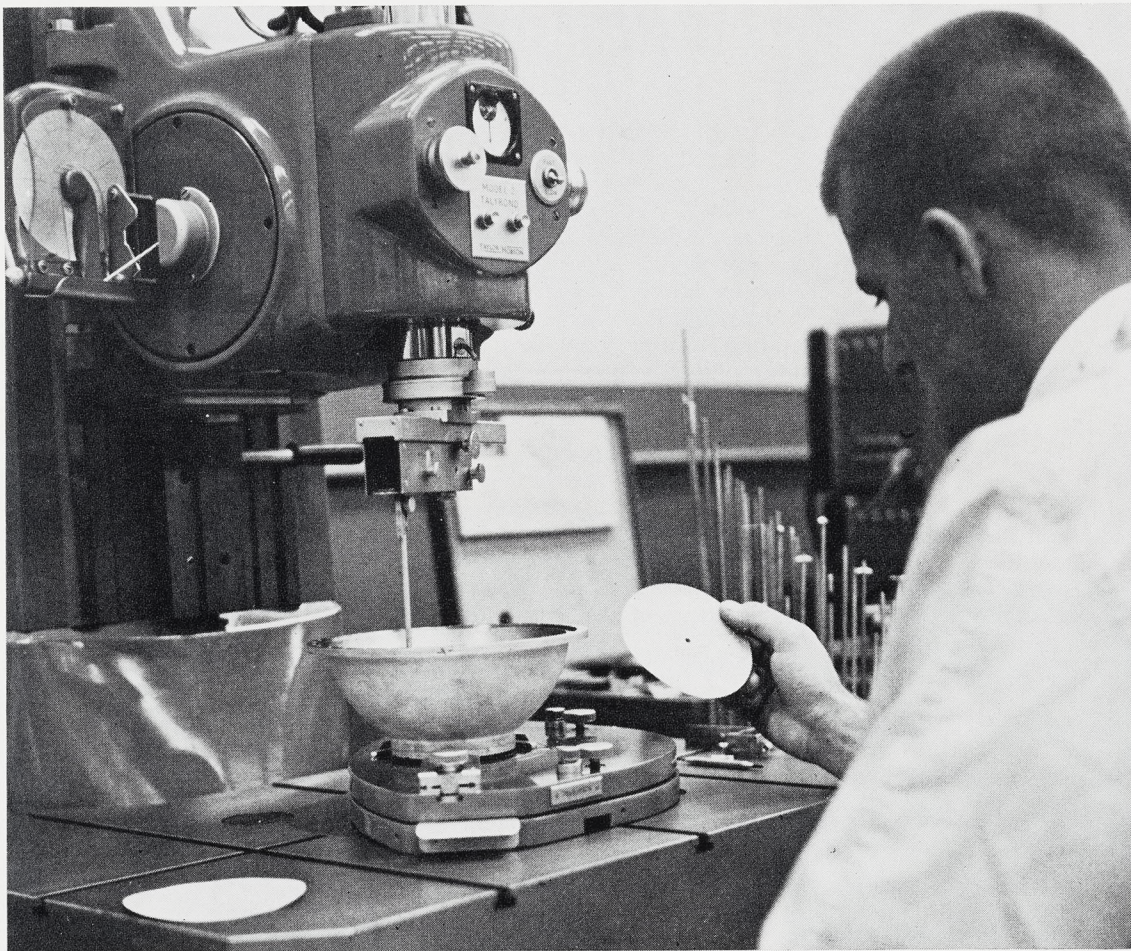
Contained in compact mobile units, these information processing centers will be available for rapid deployment to any location in the world. They will be easily adaptable to any tactical situation, according to Program Manager Parker.

The Department of Defense has established a TIPI Joint Service Program Office at Wright-Patterson Air Force Base, Ohio—the first tri-service system project office ever created.

In operation for more than 15 months, the TIPI system office

(See TIPI, page 6)

## A CHECK FOR SPHERICITY



Initial research and development hemispheres to house the C-5 navigation system being developed at Nortronics is put through exacting checks in Metrology Laboratory at Hawthorne.

David Kennard uses a Talyrond machine to measure sphericity (roundness) down to .000005th of an inch. Effort is typical of those now in progress.

## LARGEST RINGSAIL PASSES MILESTONE WITH DROP TEST

The largest parachute ever built by Northrop Corporation has been tested successfully, giving new impetus to the Century Project at Northrop Ventura.

A 128.8-foot Ringsail parachute was dropped from 15,000 feet at El Centro last month, carrying a 9500-pound test vehicle.

The redesigned Century featured a modified one-quarter spherical configuration, which was successfully employed in NASA's Mercury and Gemini manned space programs.

## Toolmakers Setting Stage For New Hawk Production

Five years is a long time, but it didn't take Nortronics Anaheim personnel very long to make up for five years of relative inactivity on the Hawk missile system when they recently received a contract.

The contract was placed by Raytheon Company, Lexington, Massachusetts, initially for launchers and loaders, to be supplied by the U.S. Government to the government of Saudi Arabia.

The contract was valued in excess of \$5 million.

Nortronics hadn't produced either launchers or loaders since

1961, and the government had recalled all its tooling on the loaders, as well as some tools for manufacture of the launchers.

But under Ray Schultz, director of Manufacturing, Nortronics quickly assembled a crew of experienced Hawk personnel and began to prepare for manufacturing the ground-to-air missile again.

"We still had most of our tooling for the launchers," Lauren Persons, chief of Production Engineering, said. "About 1800 tools were here in storage."

The tools were closely examined as they were removed from storage, minor changes in configuration were made, and latest government drawings were reviewed for changes in specifications.

Rubber parts which had deteriorated with age were replaced, and everything which needed repainting was painted.

Things weren't quite that easy with the loaders, however.

"The government had removed all its tooling for the loaders," Mr. Persons said, "so we retooled, incorporating several changes in design."

Foremost among the changes were the incorporation of different engines and transmissions by the government since Nortronics had suspended loader production.

A review of manufacturing methods on the loaders showed that it would be economically more feasible to have some items subcontracted than to make them "in house," Mr. Persons said.

(See HAWK, page 6)

## Star Tracker Big Success On Trial Run

The first shipboard trial run prior to full scale acceptance tests of a sea-going star-tracking system was reported as "remarkably successful" by program engineers at Northrop Nortronics Needham (Massachusetts) department.

The system, capable of providing highly accurate celestial fixes to check the accuracy of the ship's inertial navigation system (SINS), will be used aboard five NASA tracking ships scheduled for service in the Apollo moon program.

In the trial run late last month, the marine star tracker achieved 103 daytime fixes on a catalog of 30 stars. Average magnitude of the stars was 2.6, which means the human eye would have a difficult time distinguishing them even at night, according to Jim Hart, program manager.

The Northrop system makes the celestial fixes possible in bright sunlight.

In addition to the system tested recently, two others have been delivered—one each to General Dynamics Electric Boat Division at Quincy, Massachusetts, and Ling Temco Vought at New Orleans, Louisiana. General Dynamics is under contract to build three of the highly specialized ships, and LTV is building two.

Nortronics departments in three different cities are contributing to the project.

(See STAR TRACKER, page 6)

## PPD WILL BUILD MARK 46 TORPEDO PRECISION PARTS

Northrop Nortronics' Precision Products department at Norwood, Massachusetts, has received two contracts totaling more than \$1 million to build precision guidance instruments for the Navy's new Mark 46 deep-running torpedoes.

The largest award, made by Aerojet General Corporation, Mark 46 prime contractor, is for production for 528 miniature gyroscope and accelerometer packages which control the underwater weapon's roll, pitch and yaw attitudes. The other contract, from the Naval Ordnance Plant at Forest Park, Illinois, is for 90 identical packages to be used on torpedoes built for experimental purposes. This contract carries an option for a larger, second-year procurement of the instruments.

Prime element of the small attitude control unit, which contains three gyros and two accelerometers, is a new subminiature GR-G5 rate gyro recently developed by the Precision Products department and already in production for several defense programs. The entire Mark 46 package is about half the size of a standard cigar box.

The Mark 46, which can be launched from aircraft or ships, is designed to meet the threat of high-speed, nuclear submarines.



## FRINGE BENEFITS

## Employees' Savings Plans: Changes May Be Authorized Now



By WILLIAM LARRABEE  
Vice President—Industrial Relations

Getting back from vacation is something like diving into cold water—the shock is terrific at first but after one has been in awhile it doesn't feel so bad. The first thing that a person does, of course, is to tell everybody about his trip and then get back to work.

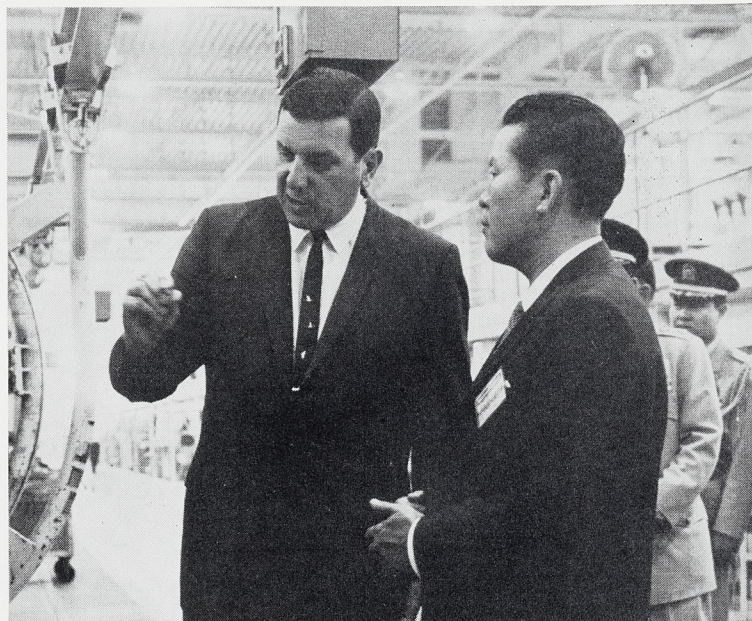
In going through all of the letters and reports and memoranda in my desk, I found that some very nice things had happened while I was away. One of the first items on top of the pile was the Savings Plan Participation Report. It was very interesting to see that every segment of the Corporation showed an increase in participation in the Salaried Employees' Savings Plan since the last quarterly report. Out here on the West Coast approximately 85 percent of our eligible salaried people are in the plan.

Everyone should know by now, of course, about the big change in the Salaried Employees' Savings Plan which becomes effective at the beginning of the first pay period on or after next August 1. At that time the company is going to permit us to increase our savings to the nearest whole dollar amount that is not more than eight percent of our salaries with a 50 percent company matching, provided we have been in the plan continuously for three years as of that time. There is one very important thing to remember about this change. Most people who will be eligible by the start date must sign up for the increased payroll deduction by July 15 or they will miss a whole three months of the increased deduction. Their deductions will start August 1. Eligible people on the Norair and Corporate office payrolls can sign up as late as July 22 since their deductions cannot start until the payroll period beginning August 7. Cards can be obtained from any Industrial Relations

office and they have been sent around to some locations which are not handy to Industrial Relations offices. People who have not picked up a card by now and turned it in, and who want the increased deduction, should move right away to get the card signed and on file. Personnel who will not have completed their three-year eligibility period by the August start date should contact their Industrial Relations office at least one month before the time they become eligible for information as to how they can increase their contributions.

The brand-new Hourly Employees' Savings Plan is also showing some good results. Participation increased in every segment of the company during the last quarter. There are now well over 4000 of our hourly-rated people in the plan and the numbers are getting higher every day. Now is a good time for any hourly people to sign up who wish to do so since by getting their cards in by July 15 (July 22 at Norair and the Corporate office) their payroll deductions can start as of the first pay period in August.

Another very pleasant thing which showed up in the mail was a completely unexpected reaction to the Northrop News article on our grievance procedure. We all knew that we had something pretty unique when an employee can go up in steps through supervision to top management with his problem and then have outside arbitration if he so desires, all at company expense. Once the article came out, however, letters began arriving from all over the United States asking for copies and how the procedure worked. Requests came from such places as Connecticut, New York, Ohio, Iowa, Nebraska, (See FRINGE BENEFITS, page 5)



NORAIL PRODUCTION LINE—Welko E. Gasich (left), Norair vice president and assistant general manager-Technical, shows the F-5 production line to General Kim Sung Eun of the Republic of Korea. General Kim and several aides toured Norair last week.

## Northrop Hosts Korean Minister of Defense

The Republic of Korea's minister of defense, General Kim Sung Eun, visited Northrop Norair last week and inspected the assembly of F-5's.

Korea is one of 12 Allied nations obtaining the Northrop-built tactical fighter, including the United States, which is using them in Vietnam. The first squadron of F-5's was turned over to the ROK Air Force in April 1965.

General Kim and four other Korean officials, accompanied by a U.S. Army escort officer, met with Thomas V. Jones, president and chairman of Northrop Corporation.

They then attended a briefing on the use of the F-5 by Free World nations (others already equipped with the jet fighter are Norway, Greece, Iran, the Republic of the Philippines, the Republic of China, Ethiopia, Turkey and Thailand, while Canada and Spain are scheduled to get the F-5 under licensing agreement).

Following lunch with Northrop officials in the Northrop Space Laboratories executive dining room, the officers inspected the Norail production line, where the F-5's are assembled.

## NORTHROP PERSONNEL DISCOVER

# Huntsville Is An Ideal Spot for Leisure Activities

If in every person there is a story, then there are 140,000 stories in Huntsville, Alabama—the melting pot of the South. And Northrop Space Laboratories has 250 of them.

In contrast to the "naked cities" in other parts of the country, Huntsville, Alabama, is a unique city in which all the major corporations are united in a common industry, income is above average and taxes are below average, and there is an outlet through which most any person's outside interests can be cultivated.

"An aura of excitement prevails in the city day to day as its 140,000 inhabitants are caught up either directly or indirectly in an atmosphere of progress created by the nation's space programs," says Walker Bennett, director of Administration for NSL's Huntsville department, who recently moved to Huntsville from Northrop Ventura's Newbury Park facility.

In 1950, when the Army moved its missile and rocket headquarters to Redstone Arsenal, near Huntsville, the city was the cotton and watercress center of the State. By the end of 1962, only 15 percent of the population were natives of the city.

The NSL department now employs 314 persons, including 63 at Cape Kennedy.

More than a score of NSL's engineers, scientists and mathematicians at Huntsville were born outside the United States, mainly Republic of China and India. Boasting an unusually high academic level, the department employs 169 college graduates, including 28 with doctorate's and 36 with master's degrees.

What do 250 well educated, space-oriented people do in a city that 15 years ago was a weekend shopping

center for farmers.

In the field of music, Danny Liu, an engineer of Chinese origin, is an accomplished violinist and plays in numerous string ensembles at church and civic activities. Warner Harris of Program Management has been a jazz pianist for 21 years and plays for clubs and Northrop parties.

In sports, Ron Radhoff, Tech Data and Graphic Services supervisor, with 4½ years experience and 600 jumps, is an experienced sport parachutist and instructor. He served two years as president of the Huntsville Sport Parachute Club and chairman of the Cottonbelt Parachute Council.

He was the 1964 Style Champion of the Southern Conference and has been two years Style Champion of the Cottonbelt Parachute Council. He has competed in some 17 parachute meets in the past two years, winning 21 awards. Ron was a principal judge in the National Parachuting championships last month at Tahlequah, Oklahoma.



Ron Radhoff falls over Alabama

*EDITOR'S NOTE: This is the second of four articles on the Huntsville department of Northrop Space Laboratories. The first (March 16) discussed the history and locale. This article tells about some of the employees. The final two will cover programs and technical accomplishments and the department's activities at Cape Kennedy. An article is also in preparation on support operations for the Nike-X program at Huntsville, which is handled by a separate NSL department.*

Malcom Mackenzie, engineer, part owner of five airplanes, is a commercial flight instructor with five Northrop employees as students. Having recently purchased an orange grove near Palm Beach, Florida, he flies to Florida approximately every six weeks. Dall Shady, member of the Technical staff, is also a commercial flight instructor of 26 years and has been a flight instructor for the Redstone Flying Club for five years. He also has taught several Northrop co-workers.

Bill Pierce, designer, has taken up scuba diving, mainly in the Panama City, Florida area, about a 7-hour drive from Huntsville. He is using this talent at Northrop to help run neutral buoyancy tests to simulate zero gravity.

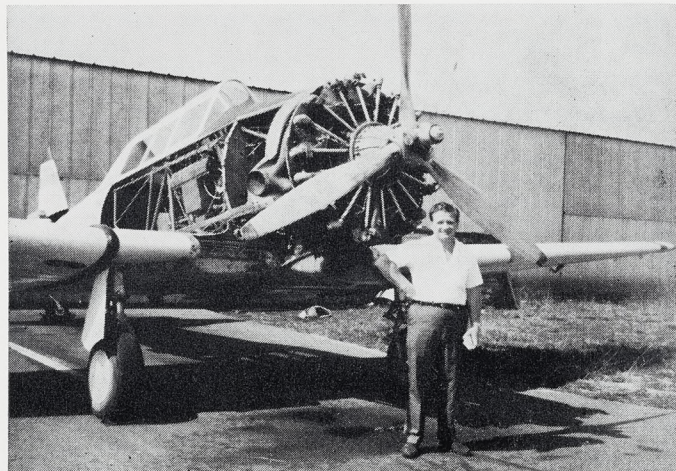
Al Merville, mathematician, and Mike

Thompson, engineer, have an avid interest in cave exploring and explore mostly in North Alabama. Mike seems to have an affection for bats, as he often takes them home in Band Aid boxes for temporary pets.

In the handicrafts field, Ted B. Taylor, Plans and Programs, relaxes constructively at woodworking. He has made almost all the furniture in his home, including a king-size bed with an adjustable, upholstered headboard for reading in bed.

When asked how he began this hobby, he declared, "It was the only way I could get furniture to fit me." (Ted is 6'4½".)

June Lucas, secretary, specializes in ceramics. The cleaning and painting is (See HUNTSVILLE, page 3)



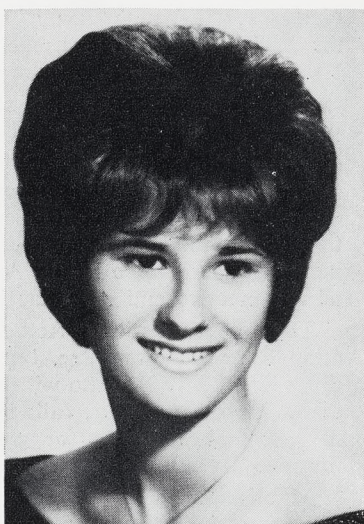
Dall Shady restores old aircraft



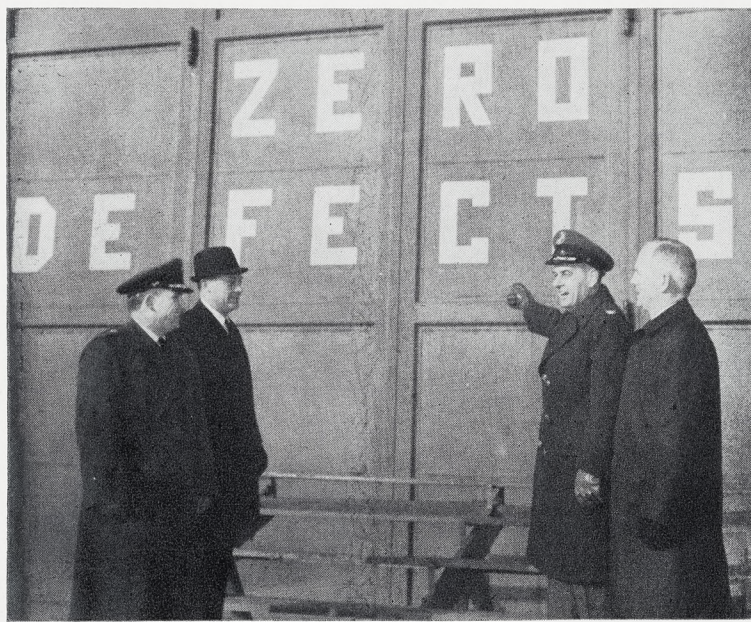
## Fortnight in Review



Northrop Ventura daughters, Diane Ewing (left) and Suzanne Capelli, are winners of Ventura Management Club-sponsored scholarships in the amounts of \$750 and \$250 respectively.



Gwynn H. Robinson (right), Northrop Corporation vice president and manager of European Operations, was recently promoted to the rank of brigadier general in the Air Force Reserve. He receives stars from Major General Carroll W. McColpin, commander of the Fourth Air Force Headquarters at Hamilton Air Force Base, California.



Northrop International's Clay Tice (right) found Zero Defects movement is worldwide when he was guest of Air Force's 49th Tactical Wing's silver anniversary observance in Germany recently. Mr. Tice commanded the Wing in the Pacific during World War II.

### NDP Plans Computer Orientation Series For New Employees

Northrop Data Processing (NDP) is formulating plans for a special three-hour orientation of all newly employed technical, engineering and scientific personnel who may be required to use NDP's general-purpose computer systems during the course of their assignments.

The program is now being coordinated with all divisional training and personnel offices; they will be the ones to identify and assign potential computer users to the NDP familiarization seminar. The first session is scheduled for August. Thereafter, the orientations will take place the first Tuesday of each month in Plant Two and the Computing Operations Center in the Engineering and Science Center.

Tak Yamashita, NDP director of Programming, indicated that these sessions are designed primarily to help the future computer user through early familiarization with the data processing services and equipment types available to him.

"Past experience suggests the need for an orientation of this nature so as to minimize possible lost time later on, on the part of technical personnel," Mr. Yamashita said.

Mr. Yamashita explained that the proper understanding and interpretation of standard practices and procedures, the way a data processing job is handled and the correct use of forms — all contributed to a user's efficiency later in his career.



Colonel Theodore Coberly, USAF, (right) has been re-assigned after heading triservice TIPI (Tactical Information Processing and Interpretation) program. He visited Nortronics prior to his departure and here chats with Frederick Stevens, Northrop vice president and Nortronics general manager. Nortronics is providing systems engineering and technical direction for TIPI program.



A Northrop Nortronics technician holds a unique "floated" inertial measurement unit which provides precise attitude information for aircraft navigation. The ball section is supported within a spherical platform by an extremely thin layer of fluid, allowing it to rotate freely to provide accurate pitch, roll and azimuth data regardless of aircraft movement. Conventional inertial platforms use mechanical instead of fluid supports. The concept will be applied to the navigation system being developed by Nortronics for the giant Lockheed-Air Force C-5A transport.

## HUNTSVILLE: An Aura of Excitement, an Atmosphere of Progress

(Continued from page 2)

done at home, but the molding and firing at Hazelhurst Ceramics. Her most elaborate product was a complete chess set for her husband.

Mr. Bennett is making an outstanding contribution to a completely different field. For two weeks in July, he will be the only U.S. layman representative from the Lutheran Church to the World Council of Churches in Geneva, Switzerland. He is one of 56 representatives chosen from all the U.S. Protestant churches. There will be a total of 400 delegates from Asia, Africa, North and South America, and Europe.

For all Northrop employees there is much to do in Huntsville, and increasingly so as the city catches up with the population explosion. Clubs such as the Amateur Radio, Antique Automobile, Rifle, Boat and Yacht, Chess, Flying and innumerable others, thrive.

Huntsville is a city in which culture — art, music, drama and the dance — is important to citizens. Activities in these fields are numerous, both professional and amateur. There are three community theater groups and a series of Broadway plays booked each season by the Broadway Theater League. Huntsville has its own civic symphony, chorus,

youth orchestra, chamber music guild, art league, ballet association, and several other organizations, and brings first-rate entertainers to the city frequently.

Many NSL employees are taking advantage of outstanding educational opportunities. Local facilities include the Huntsville Campus of the University of Alabama which offers four-year undergraduate instruction leading to degrees in mathematics, physics, English and history; the University of Alabama Research Institute; the Oakwood (Junior) College; and the Alabama Agricultural and Mechanical College.

An expansion and planning program is well established to allow an orderly growth and provide adequate services in all areas. The Heart of Huntsville Plan (for a new city complex) is a large redevelopment program under way, involving construction of a new municipal building, courthouse, library, auditorium, arts center and community park areas.

In spite of the amount of money being expended on the development of Huntsville, the per capita state and local taxes are the lowest in the Southeast, 40 percent lower than the U.S. average, and less than one-half that of California.





**COUNSELORS GET INSIDE VIEW**—Participants in a "Plans For Progress" Vocational Guidance Institute toured Norair recently as part of day-long program which included talks on equal opportunity employment practices. Roland B. Scott (right) was tour guide.

## 'Plans' Guidance Institute Draws Northrop Support

Northrop Corporation's continuing support of "Plans For Progress" program concepts is reflected in a special Vocational Guidance Institute holding its final sessions this week in Los Angeles.

Fifty selected junior and senior high school counselors are attending the three-week institute held at the University of California Extension Downtown Center and co-sponsored by the Extension and "Plans For Progress."

Northrop and other "Plans

For Progress" firms in the area are helping defray costs of conducting the Institute. And 30 of these firms, including Northrop, who embrace Equal Opportunity employment practices are opening their doors for plant tours and special discussion sessions.

Seven institute participants visited Northrop Norair June 23 for a plant tour and open discussions of such topics as employment policies, job opportunities, entry requirements for various job classifications.

Northrop participants in the discussions included Bob Catlin, Lyle Cripe, Larry Littrell, Jerry Lentz, John Chambers and Roland B. Scott.

This is the second institute staged in the Los Angeles area. Last year William Larrabee, Northrop vice president-Industrial Relations, spearheaded a move which led to industry-wide support of the program.

Basically, the Institute program is designed to enhance the counselors' understanding of the attitudes which "culturally deprived" youths have toward such matters as employment, education, family life, their place in society and the world beyond their experience. Through discussions with Northrop businessmen and others taking part in the program, educators and governmental officials, the counselors will better understand opportunities available to youth who are being adequately prepared for adulthood.

### Beverly Hills Chamber Seats William Larrabee

William Larrabee, Northrop vice president, Industrial Relations, was installed recently as the 45th president of the Beverly Hills Chamber of Commerce.

He was inducted for a one year term by retiring president Jack Matthes, manager of west coast operations for Saks Fifth Avenue, in ceremonies at the Beverly Hills Hotel.

Other officers installed were Warren F. Ackerman, first vice president; David B. Heyler, sr., second vice president; S. Laub, treasurer; J. "Bert" Edwards, executive vice president and secretary. Richard Friel, newly appointed manager of the Beverly Hills Chamber, was introduced at the event.

Ten past presidents of the chamber were among those attending the annual event.

## AD ASTRA PER ASPERA

# Landing Systems Win Recognition

Long past are the days when parachutes were simply stitched umbrellas of silk, strapped to the back of an aviator as he bailed out of a stricken airplane.

And, just as the science of aerodynamics has progressed, so has the related — but nonetheless distinct — science of landing systems.

The foremost step in the recognition of aerodynamic deceleration as a science in the scientific community has been the recent establishment of a committee by the American Institute of Aeronautics and Astronautics.

The AIAA calls it the Aerodynamic Deceleration Systems Committee, but Northrop Ventura's Theo Knacke, who will become chairman of the group next year, calls it the culmination of a seven-year battle for greater recognition for recovery and landing systems.

Mr. Knacke, who will begin a two-year term as chairman in January, believes recent recognition of landing and recovery systems will do much to advance the state-of-the-art.

"Recovery and landing systems have been a sort of stepchild for a long time," Mr. Knacke said.

"Some people even linked parachute systems more with the textile industry than with space systems. But now with the establishment of the committee, the science of recovery systems will gain long needed recognition.

"We had been trying since about 1959 to have landing systems recognized as a science of its own. This will mean more support, more applied research, more funds and more emphasis in general, and increased emphasis and attention will bring about greater progress in the field," Mr. Knacke said.

He believes that it was General Bernard Schriever who said, "Engineers tend to overestimate what they can do in two years, but underestimate what they can do in twenty years."

The same is true in the aerodynamic deceleration area.

"We once made a long range estimate in our planning on supersonic parachute systems, and we estimated far short of our results."

Working closely with Mr. Knacke in the formation of the committee were Northrop Ventura's W. H. Freeman, responsible for aerospace industry; Earl C. Myers, technical director of the Air Force 6511th Parachute Test Group at El Centro, responsible for military organizations; and Dr. Helmut Heinrich of the University of Minnesota. Dr. Heinrich was in charge of stimulating university interest in the proposed group. The work of these individuals resulted in AIAA authorization two years ago at the group's annual meeting in Dallas to form a decelerator committee.

Mr. Myers was elected the new group's first chairman, and Mr. Knacke will succeed him.

Northrop Ventura will present three technical papers at the first national AIAA symposium on Aerodynamic Deceleration Systems on September 7 through 9 in Houston, Texas.

The papers are:

"A Method of Load Prediction for Parachutes in Clusters," by John H. Moeller.

"Parametric Analyses of Parachute Landing Systems for Planetary Missions," by Phillip R. DeLurgio and Robert N. Worth.

"The Skirt Jet Attenuation System," by Edgar G. Ewing and George Frank.

Included in the three-day program will be a visit through the National Aeronautics and Space Administration (NASA) Manned Flight Space Center.

Mr. Knacke will be chairman of a Systems symposium at the convention.

Other programs at the meeting will be held on recovery fundamentals, landing systems components and tests.

Mr. Knacke, co-inventor of the ribbon parachute, has worked in deceleration systems since 1935, when he began wind tunnel tests on parachutes for Germany's Heinkel Aircraft Company.

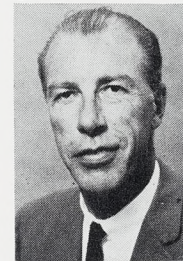
"More work is needed in our field," Mr. Knacke said. "Landing systems aren't even taught in colleges or universities, except for a few courses at the University of Minnesota."

"This means work in the field is done primarily in private industry and government laboratories, and not sufficiently in the schools, from which we could attract young scientists already interested in deceleration systems."

### Accountants Select Lancot

Senior accountant Ward E. Lancot of Northrop Ventura has been installed as vice president of the San Fernando Valley Chapter of the National Association of Accountants.

Mr. Lancot took office recently at a banquet in Panorama City.



Mr. Lancot

He has been a member of the NAA since 1945, and has been active in the Valley Chapter since it was formed three years ago. In 1964 and 1965, he was treasurer, and has been director of chapter competition for the past year.

Mr. Lancot has been with Northrop for three years.

Also installed, as director of programs, was Dan Cashier, group administrator general accounting, Northrop Ventura.

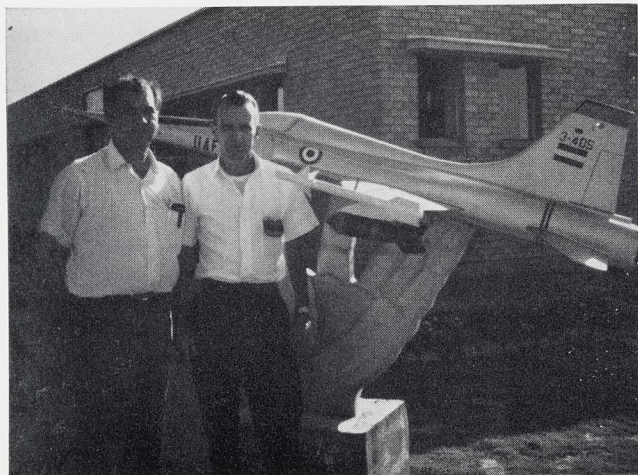
Twenty Northrop men belong to the 338-member chapter, including six from Ventura, seven from Nortronics (including four from NARD), two from Norair, four from Corporate offices, and one from Northrop Architectural Systems.

### People in the News

Presented at the AIAA's second Propulsion Joint Specialist Conference June 13-17 at Colorado Springs were four papers by members of Northrop Norair's Research and Technology section. Development of a hybrid hot gas pressurization system was W. F. Keller's topic; wind tunnel investigations of VTOL lift engine inlet was discussed by R. Lavi; A. Feder and J. A. Bogdanovic presented studies on a rocket expulsion system design; and multiple rocket engine exhaust plumes was the subject for Chong-Wei Chu, A. F. Niemann, jr., and S. A. Powers.

D. P. Wilhelm discussed his investigations of cyclic crack growth transitional behavior at the ASTM Crack Propagation Symposium last week . . . R. E. Herfert, engineering specialist in the Materials Research group recently served as a judge for the Physics division of the Sixth Annual Science Symposium held at South Hills High School, Covina. The symposium is designed to give high school students an opportunity to prepare and present research papers.

## SPOTLIGHTING INTERESTING PEOPLE AROUND THE WORLD



Norair Tech Reps J. M. Blair and A. H. Brown stand before unusual F-5 model (left), fashioned of sheet steel and mounted on hand pedestal by Iranian Air Force personnel. Bill Shuck and uniformed Turkish Air Force maintenancemen (center) perform foreign object damage inspection on F-5 at



Bandirma Air Base, Turkey. A1C John G. Hooker and S/Sgt. Dennis A. Christensen (right) stand before F-5 they have sent on more than 36 combat sorties in Vietnam without operational discrepancy being written against it.





Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

# Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

**For Sale**

**Corvair 700**, 1961, 4-dr. sedan, 4-spd., std. 6-cyl., r/h, good tires, 1-owner, \$595. L. A., 645-8278. A

**Welding Equipment**, 2-stage regulators, hose, Victor torch & tips, \$65; w/55 cu. ft. tanks & cart, \$115. Inglewood, 677-6204. A

**Trombone**, Olds Special, recently replated & aligned, \$100. Downey, TO 9-7410. A

**House**, Spanish stucco, 2-bdrm., 63 x 120 lot, zoned 5R, near Northrop, \$25,000. Inglewood, OR 1-1254. A

**House Trailer**, 1961, 50' x 10', alum. awning & steps, Pan Amer. penthouse, bank will finance 70%, \$3800. Gardena, DA 4-2133. A

**Drums**, 4 w/cymbal, high hat & stool, \$150. L.A., PL 6-6302. A

**Dining Room Table**, 36" x 44", w/2 leaves, 6 chairs, mahogany, \$35. Inglewood, PL 4-8077. A

**Ford**, 1949, 2-dr., V-8, r/h, trailer hitch, \$285. Inglewood, OR 7-7421. A

**Volkswagen**, 1965, sunroof, radio, shoulder straps, \$1549. Torrance, 371-9730. A

**Falcon Ranchero**, 1960, 3-spd. standard shift, \$550. Gardena, DA 9-9046. A

**Chevrolet**, 1956 station wagon, 2-dr., stick shift, 6-cyl., simulated wire wheels, comp. steering, new paint, r/h, \$325. Hawthorne, 679-1924. A

**DeSoto**, 1958, 4-dr. h/top, p/b, p/s, p/w, w/s/w, orig. owner, \$250. L.A., 754-4098. A

**Guns**, rifles & pistols w/ammo, approx. \$650 in firearms, \$150 in ammo., \$600. Torrance, 378-3219. A

**Motor Bike**, 3-wheel, 2-spd. trans., \$35. Redondo Bch., FR 5-0747. A

**Mustang**, 1965, 4-spd., 4-barrel carb. V-8, 289 cu. in., p/s, b/seats, chrome rims, \$2000. Cypress, 714-827-7189. A

**Washer**, 1960 custom Imperial Frigidaire, auto., \$20. Long Bch., 633-5938. A

**Love Seat**, maple, rocker-type, \$20. Torrance, 370-6734. A

**Piano**, Shoninger upright, dk. wood, \$100. Garden Grove, 714-528-8582. A

**Rug**, oval, wool hooked, approx. 9' x 12', predominantly green, \$40. Fullerton, 714-526-1521. A

**Range**, gas, O'Keefe & Merritt, 36" model, griddle, timer, \$35. Torrance, DA 3-9887. A

**VW Bumpers**, front or rear, no rust, \$16. Huntington Bch., 714-897-8201. A

**Refrigerator**, Philco, 5' high, \$35. Manhattan Bch., 379-6762. A

**Range**, Tappan 400 elec., all access. & 2 ovens, bronze, take over \$17.85 pymts. for 20 mos., \$357. Box 1301. A

**Sewing Machine**, Adler portable, w/all attachments, \$100. Hawthorne, 675-8721. A

**Alfa Romeo**, 1964, 2600 Spyder, disc brakes, 5-forward, new Pirelli's & tools, \$2895. Lynwood, 635-3784. A

**Guinea Pigs**, 1 female, 1 male, cage & food, \$5. Gardena, 324-5391. A

**Guitar Amplifier**, Gibson Titan III, 1-yr-old, cost \$700; \$425. P. V. Pen., 377-7670. A

**Renault Dauphine**, 1959, low mileage, new tires, \$195. Gardena, FA 1-4621. A

**Chevrolet**, 1966 Impala sport coupe, w/s/w, r/h, air cond., low mileage, 327 eng., \$2895. Inglewood, 674-9390. A

**Ford**, 1957 Fairlane, V-8, radio, \$300. Hawthorne, 644-3501. A

**Ford**, 1963 Galaxie 4-dr. 500 series, \$1295. L.A., 294-6403. A

**Machinist Chest**, Kennedy kit, \$25. Lawndale, 679-0876. A

**Boat**, Jefferies T. S. Express cabin cruiser, 26' x 10', sleeps 4, galley, dinette, new aft & side covers, V-dinghy, oars, 3 h.p. Evinrude, \$8900. San Pedro, FR 2-6585. A

**Volkswagen**, 1966 Squareback sedan, 10,000 miles, s/belts, special equip. tray, \$2150. Inglewood, PL 4-5358. A

**Mobile Home**, 1963, Kit Trojan 10' x 55', 2-bdrm., front kitchen, paneling, Tappan bitins, cooler, partially furn., \$3900. Hermosa Bch., FR 2-3381. A

**House**, corner, 3-bdrm., 2-car dble. gar., landscaped, patio, fenced, \$18,500. Norwalk, 864-7376. A

**Bicycle Parts**, 5 frames, 10 forks 20 wheels, tires, tubes & misc. parts, \$10. Inglewood, PL 5-4497. A

**Dot Scrambler**, 1964, excel. dirt bike, \$450. Lomita, DA 5-3494. A

**Watch**, lifetime guaranteed, 25-jewel Waltman, man's, in orig. box, retails \$110; \$89. Box 1302. A

**Camper**, 1959, 3/4-ton Ford, air cond., 10' cabover, gas refer., many extras, \$1895. Gardena, DA 4-2587. A

**Volkswagen**, 1960 sedan, 1-owner, low mileage, \$875. Rolling Hills, FR 8-2367. A

**Tool Box**, Kennedy, 7 drawers, \$10. Hawthorne, 675-9681 days. A

**Mink Coat**, autumn haze, finger-tip length, near new, fit sizes 8, 10 & 12, \$650. Culver City, EX 1-7673. A

**Car Cooler**, Bonair, 12 volts, \$20. Torrance, 371-5916. A

**Falcon Futura**, 1962, 2-dr., auto. trans., 6-cyl., r/h, b/seats, take over \$59 mo. pymnts., \$1200. Long Bch., 430-4349. A

**Chevy II**, 1963 Nova wagon, auto., p/s, p/b, r/h, lug. rack, s/belts, rear speaker, new shocks, \$1475. Torrance, FR 1-1096. A

**For Sale**

**Ford**, 1956, 2-dr., Victoria, V-8, auto., r/h, good tires, \$125. Lawndale, OS 6-6726. A

**MGTD**, 1951, completely restored, \$695. Anaheim, 527-3451. A

**Desk Ensemble**, modern, 3 sections, orange & white, approx. 9' long, \$65. Inglewood, 672-7424. A

**Fountainette**, beverage dispenser, \$85. Torrance, 835-5708. A

**Lens**, Nikkor wide angle, 28mm, 3.5 for Nikon F camera, never used, cost \$179.95; \$105. Box 1303. A

**Skeet**, 26" Charles Daly, O/U 12 ga., improved, recoil pad, trigger shoe, \$200. Hawthorne, 676-4251. A

**Bathroom Sink**, complete w/faucet & drain, \$15. Box 1304. A

**Kittens**, Siamese, 9 wks. old, house broken, purebreds, \$15 ea. Inglewood, 677-7224. A

**Own-Your-Own Apt.**, 1-bdrm., upstairs, bitins, heated pool, 1 block from stores & transportation, \$16,950. Inglewood, OR 4-7743. A

**House**, 2-bdrm., dble. gar., sundeck, lge. lot, near beach, G.I. loan, \$23,500. Manhattan Bch., FR 6-6848. A

**House**, 3-bdrm., family rm., 2-bath, sep. dining rm., 2250 sq. ft., 6 yrs., 2/3 acre, stable & corral, fully landscaped, sprinklers, \$48,000. Thousand Oaks, 805-498-3901. A

**Refrigerator**, Crosley Shelvador, white, \$45. Torrance, DA 3-8747. A

**Renault R-8**, 1963 white, good cond., \$625. Buena Pk., 522-4939. A

**Washer-Dryer**, GE comb., less than 2 yrs. old, \$150. Rolling Hills Ests., 377-3244. A

**Fiat**, 1200 Spyder, 1960, excel. mileage, \$550. Hollywood Riviera, 375-1456. A

**Stove**, elec., 2 burner, \$10. L. A., GR 2-3374. A

**Amateur Equipment**, Gonset G76B transceiver, all bands ac & 12 dc power supplies, \$190. Panorama City, 894-3244. A

**TV**, color 21", Emerson 1964, console, \$350. Inglewood, OR 3-2840. A

**Camera**, Polaroid, J-66 model w/case, used little, cost \$120; \$50. Hawthorne, OS 9-6334. A

**Surfboard**, Bing, slight nose damage, repair kit incl., \$40. Hawthorne, 644-2592. A

**Den Furniture**, coffee table & 2 end tables, \$15. Hawthorne, 675-0407. A

**House**, 3-bdrm., close to Peninsula shopping center, \$245 mo. lease or \$30,800. P. V. Pen., FR 8-5475. A

**House**, 5-bdrm., 1-level, family rm., all bitins, lge. patio, landscaped, fruit trees, 2273 sq. ft., 2-car gar., 5 minutes to Nortronics P. V., \$49,950. P. V. Pen., 377-5319. A

**House**, 3-bdrm., 1 1/4 bath, covered patio, sprinklers, other extras, 2 blocks from El Camino, 10% dn., \$25,600. Gardena, 329-5082. A

**House**, 3-bdrm., 2-bath, dining area, lge. front rm., driftwood stone fireplace, rec. painted & carpeted, 4 blocks from elementary school, \$265 mo. lease or \$38,750. Redondo Bch., FR 5-3521. A

**Stereo Hi-Fi**, tape recorder, Berlant 33 broadcast, 2 Eico HF60 60 watts amps., Eico HF91 FM tuner, Eico HF 85 stereo preamp, many access., orig. cost \$2064; \$600 or sell sep. East View, TE 3-4153. A

**House**, 3-bdrm., bitins, bltin TV/Hi-Fi area, raised fireplace, 500 sq. ft. playrm-workshop, 2 1/2 car gar., fruit trees, walking dist. to shops, 20% dn., \$26,000. Alhambra, AT 4-5698. A

**Apt**, duplex, 1-bdrm. ea., R-3 zone, room to build, \$17,500. So. Gate, 695-7497. A

**Surfboard**, Jacobs, 9'4", \$60. Torrance, 379-7165. A

**Swimming Pool Filter**, Romar, 1/4 h.p. Cartridge type, 1100 gal. hr. circulation rate, 2 yrs. old, \$20. Torrance, 323-4257. A

**Console**, Hi-Fi, Dynaphone radio-phonograph-microphone-amplifier, excel. for elec. guitar, \$60. Hawthorne, 676-0418. A

**Dining Table**, Duncan Phyfe, mahogany, w/4 chairs, table pads, extra leaves, \$35. Hermosa Bch., 374-5425. A

**Camper** for stepside Chev. pickup, 1/2 ton, \$50. Redondo Bch., FR 2-5310. A

**Chrysler New Yorker**, 1965, 4-dr. h/top, full power, air cond., auto., 9500 act. miles, orig. cost, \$4750; \$200 equity & take over \$117 mo. pymts., \$3411 bal. Buena Pk., TA 7-1352. A

**Cemetery Lots**, 2 dble. interment, Inglewood Cemetery, Parkview section, \$1200. Gardena, 329-5637. A

**Range**, Hotpoint deluxe, 36" elec., 4-burners, dble. oven, \$100. Anaheim, 524-1728. A

**Movie Camera**, 8mm, Mansfield Holiday auto., zoom lens, light meter, pistol grip, leather carrying case & tripod in case, used 3 times, \$60. Box 1305. A

**Refrigerator**, Frostless, 1-yr.-old, 13.6 cu. ft., \$150. Hawthorne, OS 6-3912. A

**Stereo Speakers**, enclosures, Electro Voice Marquis enclosure w/Electro Voice 12TRXB speakers, \$90. Manhattan Bch., 374-5635. A

**Revolver**, .22 Midget, 4" barrel, dble. action, reg., never fired, \$15. Hawthorne, 679-6581. A

**Monza**, 1962, 2-dr. club coupe, auto. trans., r/h, \$825. Torrance, 375-4593. A

**Volkswagen**, 1965, 1300 sedan, radio, low mileage, \$1450. Manhattan Bch., FR 9-5120. A

**Refrigerator**, \$75. L.A., 751-0981. A

**For Sale**

**Honda**, 1965 250 c.c. Scrambler, new Honda experimental clutch, extra carb. work, \$575. L. A., VE 7-6714. A

**Aquarium**, 15-gal., tank incl. reflector, gro-lux lamp & air pump, \$22.50. Santa Susana, 805-527-1974. A

**Pickup**, 1957 Ford Ranchero, air conditioning, r/h, near new eng., \$650. Hawthorne, OS 5-8335. A

**Motorcycle**, Honda 305 Superhawk, custom seat & tank, lots of chrome, low mileage, \$650. L.A., PL 6-7681. A

**Home**, 3-bdrm., 1 1/2 bath, dishwasher, lge. covered patio, 18' x 20' sep. rumpus rm., block walls & planters, terrace, tropical landscaping, fruit trees, walk to Northrop, \$25,500. Hawthorne, OS 6-8842. A

**Car Cooler**, inside-type, 12 volts, used 1 season, \$10. Torrance, 375-6467. A

**Golf Clubs**, 1965 Wilson-Staff, swing wt. D3-stiff, 14 clubs, less than 6 mos. old, \$324 retail; \$160. L.A., 838-8356. A

**House**, 4-bdrm., family rm., 2 1/2 baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

**Austin Healey 3000 MKIII**, 1964, wood dash, wire wheels, \$2350. Redondo Bch., 379-7567. A

**Pickup**, 1960 Ford, 1/2-ton, lge. bed, 8 1/2' non-cabover camper w/bltins & intercom, \$1275; camper alone, \$475. Torrance, 320-3440. A

**Aquarium**, 3 10 gals. ea. w/reflectors & filters, \$15. P. V. Ests., 375-9842. A

**Acreage**, near Rosamond, in Antelope Valley-East Kern water dist., 10 acres at \$595 acre. Torrance, FR 8-1026. A

**Apt. Bldg.**, 10 units, 9 1-bdrm., 1 2-bdrm., near Northrop, 4 yrs. old, 2 garages, 7 carports, \$89,000. Lawndale, OS 5-9695. A

**Canary Bird Cage**, lge., used little, \$5. Hawthorne, OS 6-0041. A

**House**, 3-bdrm., 2 baths, heated pool, block-wall fence, foot of Rolling Hills, buyer can assume 5 1/4% FHA loan, \$5000 dn., \$32,000. Torrance, 326-3575, DA 6-9413. A

**Arbor Table Saw**, 10" tilting Craftsman, on metal stand, 1 h.p. motor, \$115. L.A., VE 8-6054. A

**House**, 2-bdrm., 2-car gar., landscaped yard, redwood patio, playhouse, low down, \$19,950. Hawthorne, OS 9-7674. A

**Chevrolet**, 1958 station wagon, big eng., good mech. condition, \$275. Wilmington, 834-4184. A

**Organ**, Hammond M-3 spinet w/percussion, unmarred maple finish, \$795. San Pedro, 831-5837. A

**Home**, 3-bdrm., cape cod-style, tile roof, family & dining rooms, workshop, \$55,000. Miraleste, TE 3-5515. A

**House**, 2-bdrm., full dining room, fireplace, dble. garage, \$20,950. Inglewood, OR 1-3860, FR 5-5097. A

**Ford Galaxie**, 1965 tudor, r/h, p/s, factory air, 15,000 miles, \$2395. Long Bch., GA 3-1363. A

**Home**, 3-bdrm. & lge. den, patio & fenced yd., near schools & fwy., low down, decorator liv. rm., \$21,900. Gardena, DA 9-2904. A

**Falcon**, 1960 2-dr., stick shift, recently overhauled, new brakes, \$475. San Pedro, 833-5774. A

**Pups**, wiemaraner, 34 champions in pedigree, AKC reg., \$100. Rolling Hills, 377-1281. A

**Poodles**, miniature, apricot, AKC reg., avail. July 13, \$75. Gardena, 324-8613. A

**Go-Cart**, w/engine, \$50. Palos Verdes, 377-7361. A

**Ford Taunus**, 1961 4-dr. deluxe sedan, r/h, s/belts, 4-spd. trans., \$350. San Pedro, 831-9600. A

**Motorcycle**, 1965 Gilera, scrambler dirt bike, less than 800 miles, \$500. Hawthorne, 679-2006. A

**Falcon**, 1961, 2-dr., r/h, vinyl interior, \$300. Redondo Bch., FR 4-1509. A

**Wanted to Buy**

**Cement Mixer**, 4 to 8 cu. ft., elec. or gas driven, any condition. Lawndale, 679-2642. B

**For Trade**

**Chevrolet**, 1958 Impala sport coupe, 348 cu. in. eng., chrome wheels, trade for older station wagon & cash. Lynwood, 632-2642. C

**FREE (To Be Given Away)**

**Kittens**, 6, 1/2 & 1/4 Siamese. Long Bch., GA 4-9750. D

**Dog**, part miniature Schnauzer, 4 yrs. old, pepper color, Rolling Hills Ests., FR 5-8536. D

**Rentals Offered**

**Apt.**, 2-bdrm., newly decorated, washer-dryer hookup, bltin range & oven, furn. or unfurn., from \$100. Brea, 528-4553. E

**Apts.**, unfurn., 1, 2 & 3 bdrm., pvt. balconies, closed gar., sound proofing, hobby shop, children OK, from \$95 mo. Torrance, FR 5-0867. E

**Bachelor Apt.**, single, furn., laundry facilities, 10 minutes to Northrop, \$70. Inglewood, 677-5705. E

**Apt.**, 2-bdrm., 1-bath, water pd., children OK, no pets, 10 minutes from Northrop, parking, \$95 & up. Inglewood, OR 0-4473. E

**Apt.**, 3-bdrm., 2 baths, vicinity Pico & La Cienega, \$165 mo. L.A., WE 5-4006, WE 5-9148. E

**Apt**, 1-bdrm., deluxe, pool, bitins, \$95 mo. Redondo Bch., 376-2117. E

**Apt**, deluxe 2-bdrm., furn., lge. pool, bitins, closed gar., near El Camino, \$145. Torrance, DA 9-5986. E

**Apt**, unfurn., 1-bdrm., 3 blocks to beach & King Harbor, piped music, bltin vacuum, gar. storage, \$105 mo. Miraleste, FR 9-8801. E

**Cabin**, Green Valley Lake, August reservations open, \$60 wk. Torrance, 320-2002. E

**Apt**, 2-bdrm., bltin oven, range, disp., pullman bath, thermo heat, carport, play yard, 2 children OK, \$100 mo. Torrance, 320-2827. E

**Apts**, all elec., unfurn., pvt. patio, lge. closets, many extras, \$130 & up. Torrance, DA 5-4021. E

**Vacation Houses**, in Balboa, reservations being taken; 2-bdrm. avail. July, Aug., \$125 wk., 4-bdrm. avail. July, \$200 wk. Inglewood, 672-3764. E

**House**, 4-bdrm., 1 1/4 bath, bitins, sep. dining rm., covered patio, fenced yd., newly decorated, near Nortronics P. V., avail. Aug. 1, \$200 mo. lease. San Pedro, 381-3438. E

**Apt**, deluxe 2-bdrm., furn., lge. rooms, bitins, encl. tub/shower, carport, & storage, near Norair, \$140. Hawthorne, 674-1358. E

**Cabin**, Lake Arrowhead, close to lake & village, \$55 wk.; \$25 w/end. No. Hollywood, 761-9645. E

**Apt**, 2-bdrm., upper, unfurn., bitins, carport, adults, no pets, \$135 mo. Inglewood, 672-8211. E

**Apt**, 2-bdrm., gar., disposal, small yard, 5 mins. to Northrop, \$95 mo. Hawthorne, 325-5705. E

**Apt**, 2-bdrm., lower unit, stove, bitins, 2 blks. from Norair, \$115 mo. Hawthorne, OS 6-7417. E

**Vacation Cottages**, Idyllwild, sleeping for 6, secluded, stream, patios, \$20-\$35 w/ends, \$50-\$60 wk. L.A., PL 4-5288. E

**Apt**, 3-bdrm., redecorated, bitins, disp., extra closets, carports, 2 baths, lge. family rm., \$160. Hawthorne, 676-2389. E

**Studio Apt**, spacious 2-bdrm., 2 1/2 bath, lux. features, sub. parking, \$180 on 12 mo. lease. Inglewood, 670-6084. E

## Going my way?

**Rides Wanted**

**7:30 a.m. — 4:12 p.m.**

**Studebaker & Foster**, Norwalk. Margaret Williams, Norair, ext. 4388, 868-9414. 3

**7:30 a.m. — 4:15 p.m.**

**Marine & Highland**, Manhattan Beach. L. Berg, Norair, ext. 2763, 379-6762. 3

**8 a.m. — 4:45 p.m.**

**Brookhurst Ave. & Crescent**, Anaheim. Peggy M. Thomas, Nor. Anaheim, ext. 557, 774-4331. 5

**Anaheim & Figueroa via Harbor Fwy.**, Wilmington. Tom Henrich, Norair, ext. 2425, 835-9070. 5

**Prairie & Florence**, Inglewood. Drive part time from that area. John Loest, Norair, ext. 4789, OR 2-4447. 5

**Brookhurst & Adams, Huntington Beach or Harbor & Adams**, Costa Mesa. Gene Dukette, Nor. Anaheim, ext. 438, 962-3763. 5

**Venice & Sepulveda**, Los Angeles. Sheldon Ossoff, Norair, ext. 1016, 837-2916. 5

**Prospect & 190th**, Redondo Beach. Guy W. Phillips, FR 4-1509. 5

**Rides Offered**

**7:30 a.m. — 4:12 p.m.**

**Studebaker & Foster**, Norwalk. Margaret Williams, Norair, ext. 4388, 868-9414. 13

**8 a.m. — 4:45 p.m.**

**Brookhurst & Adams, Huntington Beach or Harbor & Adams**, Costa Mesa. Gene Dukette, Nor. Anaheim, ext. 438, 962-3763. 15

**Venice & Sepulveda**, Los Angeles. Sheldon Ossoff, Norair, ext. 1016, 837-2916. 15

**Personals**

**Flying Club**, new Cessna 150's, full gyro panel, I.L.S. equipped, 2 certified flight instructors, \$7 hr. wet. Torrance, Hawthorne, OS 6-6138, DA 5-5288. L

**For Sale or Trade**

**Cabin**, 1-bdrm., 25' x 100' lot, Big Bear area, existing loan bal. \$7500; \$9500. or trade equity for property. Torrance, 328-0605. M

**Comet**, 1961 deluxe, stick, 1-owner, \$400 or trade for station wagon. Hawthorne, 327-2796. M

**House**, 5-bdrm., 2 1/2 bath, 4000 sq. ft., on 1/2 acre view lot, consider terms, \$77,000 or trade for income property or home. W. Covina, 339-8008. M

## RETIREES

A second meeting of Northrop retired personnel who are organizing a new club just for retirees will be held at 12:30 p.m., Monday (July 11) at NRC Clubhouse, Hawthorne.

More than 50 retired employees were on hand June 12 for an initial get-together and planning session. They named key committees to formulate plans for various phases of the program.

Combined NRC Councils have assisted in setting up the program which will be operated for and by the retirees. All former employees are invited to attend the July 11 gathering.

## SQUARE DANCE

Northrop Recreation Club is sponsoring a beginner's class in square dancing for teenagers to be held at the NRC Clubhouse, Hawthorne, opening Saturday, July 19 at 10 a.m.

## FRINGE BENEFITS

(Continued from page 2)

and Indiana. All of this is a tribute to our people who worked out the grievance procedure and an even better indication than we had before that our people really have an unusual "hot line to management".

The mail bag was pretty good in some other respects. There were some nice letters from some of our people and some good suggestions. As an example, one gentleman who has been under the weather and on medical leave for about two months wrote in saying how well our insurance people were taking care of him and making a suggestion which some of us should have thought of before. He told how nice it would be if the shut-ins could have copies of the Northrop News sent to them to keep them up to date as to what was going on. Arrangements are now being made to get this done. This brought to mind the fact that lots of retirees are interested in keeping in touch with their old company and with all of their friends at Northrop. There was a memorandum on my

desk telling about the things that the Northrop Recreation Club is doing to make sure that when we retire we can still feel that we are part of the company. All of us have to think about that approaching age and it is nice that we can include in our retirement planning the fact that Northrop people are still interested in us and that we will have a recreation program tailored especially to our needs.

Another change is being made in our insurance program which should be of interest to lots of our ladies. Up to now, men could get dependents' coverage involving their wives but women could not get the same coverage involving their husbands. There will be an announcement out in our various divisions as to the replacement of the old with the new coverage and how our ladies can obtain it if they wish. The effective date would be about August 1.

It was good to be away but it's just as good to be back.



## H. V. Bray Appointed Director

Northrop Nortronics has announced the appointment of H. V. (Vic) Bray to the newly created position of director of Marketing Operations.



Under the direction of the Division Marketing manager, Mr. Bray will be responsible for the management of Nortronics field offices, the coordination of sales activity between departments, sales training and marketing liaison for product support.

Mr. Bray joined Nortronics in 1962 as a chief applications engineer. Before joining Northrop, he was manager of government programs for Beckman Instruments, Inc., from 1961 and 1962, and sales manager for the Bendix Products Division of Bendix Corporation, from 1952 to 1961.

### TIPI

(Continued from page 1)

has already monitored a series of study contracts involving various concepts in the over-all program.

As a major intelligence program, the TIPI work fits perfectly into technologies emphasized by the Division's newly-reorganized Space and Information Systems section, according to section director Mike Turney of Palos Verdes.

The section concentrates on three major areas—data acquisition, intelligence, command and control—which together make it possible for the Division to better define and produce the systems hardware required by aerospace and defense programs, Mr. Turney said.

"The field of intelligence systems is a relatively new one," he added, "but we have been fortunate in building an organization of men with extensive backgrounds in this work."

The Nortronics organization includes specialists in such fields as intelligence systems, photo processing, photographic reproduction, electro-optics, electronics, data processing and information display.

Approximately 90 persons are assigned to the Nortronics TIPI program.

### STAR TRACKER

(Continued from page 1)

uting to the star-tracking system, with prime responsibility at Needham. The star sensor itself was developed and manufactured at Palos Verdes. Gyroscopes came from Precision Products department at Norwood, Massachusetts. Stabilization platform, gimbal structure, astrodome, and other associated equipment are manufactured at Needham.

The star tracker's function is to monitor and update the SINS outputs in position and heading.

An additional function of the star tracker, recently added to the program by NASA, is to calibrate radar systems aboard the ships, according to Mike Kerpchar of Palos Verdes.

It will do this by taking a fix on a balloon, launched specifically for this purpose, and comparing its results with that of ship-board radar.



**ZOOMING OPERATIONS**—Nortronics-produced 50-to-1 dynamic range zoom lens above has only one moving part, was delivered recently to Boeing Company for use with electro-guidance simulator which tests accuracy of missile homing systems. Earl Cornwell is the operator above.

## HAWK: Re-Tooling for Production Involves Variety of Assignments

(Continued from page 1)

Norair was contacted to provide support in welding, and other items were sent to subcontractors.

The wings and the actuators of the 16-foot Hawk provided few problems, since both parts still were being produced under spares contracts.

One recent change in wing manufacture, however, called for a thickness check in 14 places. Fortunately, Mr. Persons said, tolerance already was very precise on the wing production.

To prepare for delivery of launchers and loaders by September, the Nortronics Anaheim Tool Room is working two shifts. Tool Engineering and Planning are still at one shift per day.

Twenty-one employees — most of them toolmakers — comprise the Hawk force. Art Eckel, supervisor of Planning and Liaison, is aiding in coordination of the work effort.

Grant Gunderson, chief of

Production, and D. Niccoli, superintendent, Assembly, head the work force.

Delivery of wings and actuators is scheduled to continue through October. Launcher and loader production is scheduled through next May.

The radar-guided Hawk is used as protection against aircraft at medium and low altitudes.

Nortronics first entered the Hawk program in 1954.

The Hawk is used by both the U.S. Army and Marine Corps, in Vietnam, and elsewhere.

### Double-Header Grid Tickets Now Available

Northrop Recreation Club at Nortronics Anaheim has obtained a block of 100 tickets for a big American Football League "double-header" gridiron classic to be played August 20 at Anaheim Stadium.

Tickets, all near the 50-yard line, sell for \$6 each and may be obtained through NRC.

## Nortronics Delivers 50:1 Dynamic Range Zoom Lens

A 50-to-1 dynamic range zoom lens, the latest and most powerful in a series of optical zoom systems, has been produced by Northrop Nortronics.

The first 50:1 system has been delivered to the Boeing Company, Kent, Washington, for its electro-optical guidance simulator which tests the accuracy of missile homing devices. The Northrop Nortronics' zoom lens projects target images on the screen at 4 to 200 times the normal size of the images on the film during the simulated missile strikes.

The zoom lenses are completely optically compensated systems, with only one moving part. Conventional systems are mechanically compensated and require many moving parts.

Images are kept in focus at all times during the zooming operation with the Nortronics system,

and the deterioration of parts due to wear is eliminated.

The 50:1 system includes a 2500-watt xenon light source for illumination with a movable condenser system which fills the entrance pupil of the zoom lens at all magnification ranges.

The lens is 57 inches long, the illumination system housing is 24 inches long and the distance from film to screen is about 11 feet.



Minot "Mr. B" Butler ended 24-year Northrop career when he retired recently. More than 200 well wishers gathered at Palos Verdes to bid him adieu, present gifts like those shown.

## TRIVCO TAKES FIFTH PLACE AMONG 830 JA FIRMS IN REGIONAL

Trivco, the Junior Achievement company counseled by Nortronics Anaheim, has been judged the best among 172 Southern California companies and fifth among 830 in the West.

The company, which manufactured and sold decorative mosaic trivets for kitchen use during the school year, was counseled by four Nortronics employees. They were:

M. A. (Cy) Seeley, management advisor; Leo Gross, production advisor; Adie Weishaar, sales advisor; and Ira Coleman, alternate advisor.

The Western regional judging included companies from 13 states and two provinces of Canada; in all, as far removed as Alaska, Hawaii, British Columbia and Alberta.

John Brown, president of the 18-worker company, will receive an expense-paid trip next month to the University of Indiana to witness the final judging.

Other officers in the company were Christine Thayer, vice president-Sales; Ronna Durante, vice president-Manufacturing; Lesley Hutchinson, secretary; and Katie Heinz, treasurer.

Junior Achievement rules specify that participating students must be in the 10th, 11th or 12th grade. All the Trivco students were sophomores and juniors, and will be eligible to participate again in the 1966-67 school year.

Mr. Gross, as the school year ended, completed his seventh year as a Junior Achievement advisor. He has been active in the program since it was formed in Orange County.

## FOR THE BOYS IN VIETNAM



Donors above are typical of more than 100 who turned out at Anaheim to help replenish Vietnam blood reserves. Four-bed bloodmobile was kept busy during entire period.

Other Nortronics personnel gave at Hawthorne. Total Northrop donation was 441 pints collected in three locations.



## Lifting Body Vehicle in First Glide

The Northrop-built M2-F2 lifting body research vehicle was launched on its first free glide flight early last week in an almost letter-perfect operation conducted at Edwards, California.

At the controls was Milton O. Thompson, chief lifting body research pilot for NASA's Flight Research Center.

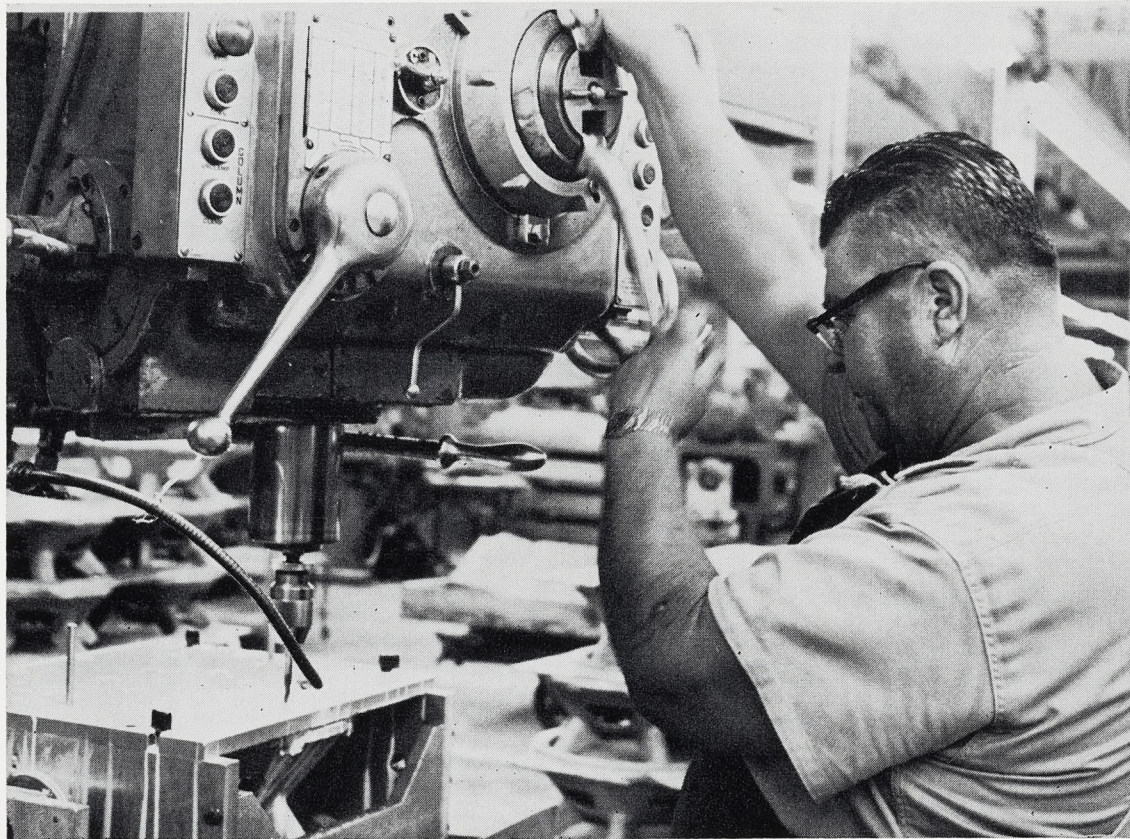
Carried aloft under the wing of a B-52, the M2-F2 was launched at an altitude of 45,000 feet and a launch speed of about 450 miles per hour. Plunging earthward in a series of controlled maneuvers, the M2-F2 descended at a rate of about two and one-half miles per minute until at 1200 feet altitude, Mr. Thompson flared to reduce his descent to 10 feet per second. It touched down to a perfect landing on a Rogers Dry Lake runway 3 minutes and 37 seconds following launch.

This flight, the first ever conducted with a manned all-metal lifting body, is being heralded as a big step forward in technological studies of future manned re-entry vehicles.

NASA's office of Advanced Research and Technology is investigating the lifting body concept in flight to establish the technological base for design of future manned re-entry vehicles.

The lifting body, which is airborne by aerodynamic lift obtained from its rounded half-cone shape, promises greater maneuverability and flexibility to the nation's space programs. It offers a means by which a pilot returning from space could select, from a wide range of possibilities, suitable landing sites within the United States.

Northrop has played a key role in all manned re-entry missions to date, building the parachute recovery system for both Mercury and Gemini programs already conducted or in progress and also for the forthcoming (See LIFTING BODY, page 3)



ANYONE SEE A WHEEL?—Carefully mounted in this radial drill press operated by Charlie Smith is a wheel assembly for a Hawk missile loader. Mr. Smith is typical of veteran

Nortronics Anaheim Machine shop personnel currently turning out parts and components for the widest range of programs ever supported by the shop.

## PAC/WALL REVEALS 'WEATHERPROOF' METAL COATING

A superior organic finishing process guaranteed to outlast all known exterior finishes has been developed by Pacific Curtainwall, Inc., in conjunction with the Goodyear Tire and Rubber Company's Chemical Division of Akron, Ohio.

Pacific Curtainwall, headquartered at Long Beach, California, is a wholly-owned Northrop subsidiary which specializes in architectural design, metals and products.

The new coating process, called Pac/Weld, is a significant breakthrough in the long fight against corrosion, according to Douglas B. McFarland, president of the company.

Pac/Weld is being guaranteed for a minimum of 10 years and in most applications is expected to last up to 20 years or life. The life expectancy of conventional organic finishes is less than five years (See CURTAINWALL, page 6)

## Versatile Machinists Take Diversification in Stride

Things are really humming in the Northrop Nortronics Machine shop.

Behind this buzz of activity is the task of directly supporting one of the most diversified line of products ever centered at Nortronics, a division where diversification is commonplace, not unusual.

Nortronics' Machine shop, located at Anaheim, is currently turning out parts, components and systems destined for use by United States Navy, Army, Air Force and Marine Corps personnel, as well as defense forces of allied nations and select commercial customers.

And the parts involved run the full spectrum of complexity.

For instance, there are precision parts for aircraft guidance systems of tomorrow, some precision bored and aligned, to tolerances of 20 millionths of an

inch, plus equally close-tolerance work on components for computer and information systems. There are also standard aircraft parts going into 11 major assemblies Nortronics produces for the Northrop F-5 and T-38 supersonic jets. Work is also in progress on a wide range of automated test equipment systems. And activities are steadily increasing in the production of components for Hawk launchers and loaders, while production of Hawk elevons, wings and actuators continues. Other activities involve still other ordnance and munitions systems. Topping all of this is the continuing direct support of research and development work, plus special projects.

In its fabrication tasks the Machine shop works with almost any type of metal you can name—common aluminum and stainless steel, titanium, magnesium and the exotic materials much in demand today.

"This complexity of product lines necessitates a multifaceted organization manned by a unique type of machinist, a group of men versatile enough to do many jobs," said Ray Schultz, director of Manufacturing. "We are fortunate in having some of the best machinists anywhere."

Mr. Schultz noted the Machine shop is staffed by approximately 150 men at present with increases in personnel daily. Of the 150, some 50 have been with Nortronics 10 years or more and another 50 have completed at least seven years with Northrop.

Pete Falk, Machine shop general foreman, added:

"Many of our machinists can perform any task we assign them which provides us with an extremely important versatility factor. And we have a half-dozen or (See MACHINISTS, page 6)

## Page Signs \$71 Million Army Pact

The U.S. Army Electronics Command, Fort Monmouth, New Jersey, has awarded Northrop Corporation's Page Communications Engineers, Inc., a \$71,679,900 contract for overseas communications systems. The order represents the largest single contract ever awarded by the Army Electronics Command.

As contractor, Page Communications Engineers will engineer, furnish and install and provide for one year of operation and maintenance of an integrated wideband communications system in a portion of Southeast Asia.

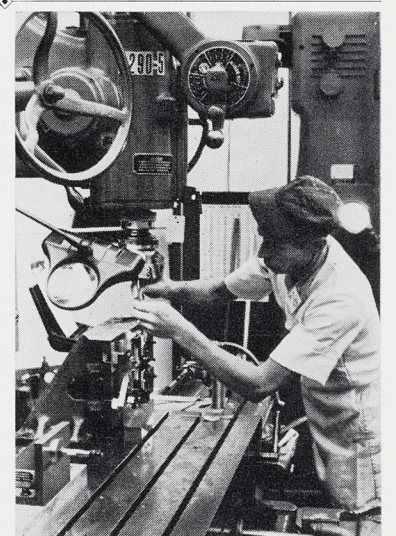
Page, with headquarters in Washington, D.C., is a wholly-owned subsidiary of Northrop. Page is a pioneer in the management, design, installation and operation of world-wide communications systems and has had extensive experience in the communications requirements peculiar to Southeast Asia.

In 1962 the U.S. Department of Defense assigned Page the task of installing a high priority military communications system in South Vietnam. Within seven months the country had an operational mobile troposcatter system, the largest of its type anywhere. Normally this project would have taken up to two years.

The system and subsequent improvements and additions to the so-called "backbone network" is managed by the Defense Communications Agency and maintained by Page's civilian engineers and technicians. It is operated by the four military services.

The major portion of communications equipment in Southeast Asia uses the tropospheric scatter principle. In scatter communications, powerful transmitters direct narrow radio beams at angles a few degrees above the horizon. The beams encounter irregularities in either the troposphere or the ionosphere (depending on the frequencies used) and then scatter downward to receiving antennas hundreds of miles away.

Page engineers were among the first to design and build tropo and iono systems.



In a special temperature-controlled shop area at Nortronics Anaheim, Machinist Ernie Shuman fits a new bit in a precision jig boring machine.

## STREET, THAT IS

## Sailing Over the Bounding 'Main'

Sometime next year the Bob Clays of Nortronics Hawthorne plan to move into their new home which, among other advantages, will provide their two small children with the world's largest ocean for a back yard.

Bob is supervisor of Business Systems Development unit, and Liz works in Material Control. Their two sons are Robbie, 4, and Chuck, 1.

Their new home will be a 52-foot schooner, which is not too unusual in this sailing-minded community. What makes their floating domicile unique is the fact that Bob and Elizabeth are building it themselves.

They laid the keel on St. Patrick's Day three years ago and said this month they expect to

complete the job in about one more year.

"We've worked weekends, vacations and an average of about two nights a week. I'd estimate that about 3500 man-hours have gone into the project so far," says Bob, who designed the boat himself in about six months.

His only prerequisites were a lifetime of love for sailing and a correspondence course from the Westlawn School of Yacht Design of Montville, New Jersey.

At the construction site, on Main Street near Artesia Boulevard in south Los Angeles, the unfinished schooner is already beginning to look like a work of art as well as a luxuriously practical abode.

There is a salon, a forward

state room, and the main cabin that includes a dinette which converts into bunks. There are also one and a half baths. Power comes from a 24-volt electrical system.

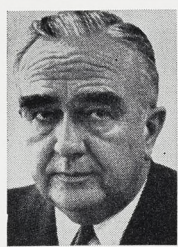
A 60 horsepower diesel engine has been installed as an auxiliary means of propulsion, but the two masts have not been installed as yet. The sails will be the only part not built or fabricated by the Clays.

Mahogany and teak woods are the principal raw materials for the yacht which, when completed, will sleep eight, draw seven feet of water and weigh 22½ tons. More than 4000 bronze screws and 10,000 bronze nails have already been used in the teak deck (See BOAT, page 6)



## FRINGE BENEFITS

## Retirement: Northrop Prefers To Consider the Human Element



By WILLIAM LARRABEE  
Vice President—Industrial Relations

Two gentlemen spoke to me recently about the possibility of continuing work at Northrop after age 65. From my discussion with them I gathered that the Northrop attitude in this respect is not too clear to our people. This is not a bit surprising because no company has ever been able to come up with a perfect answer to the retirement age problem. The simple thing to do, of course, is to establish a rule which many companies have which says, in substance, "Age 65—Out." This leaves no question in anybody's mind as to when his employment with his company is over. It affects everyone from the President on down. It has some good points, such as the assurance it gives to the young person coming along that the boss is not going to work until age 75 or 80 and deny him the advancement which he otherwise would have had. Organizations with mandatory retirement age insist that they thus keep real comers on their payrolls who would otherwise go somewhere else. Perhaps they are right in this thinking. The big trouble with this approach is that it eliminates the human element which has always been so important at Northrop. The minute one takes human elements into account, however, one runs into human problems.

The difficulties with a flexible system are pretty apparent. In the first place, most people getting into their 60's are perfectly convinced that they are just as good as they were when they were 40, and they are not about to be told otherwise. In fact, some people are as good or better in their 60's, particularly in view of their long experience and mature judgment. Secondly, many people who get into their 60's and who are really incapable of keeping on with their work have financial problems and need the income which work brings. In the third place, many people who have worked all their lives have a sense of insecurity about cutting loose. Lastly, and probably the toughest problem of all, is that under a flexible system someone in the company has to make a decision that one person may continue work and another may not.

Whole books have been written on this subject of retirement. Out of all of the information on the subject Northrop has tried to find a reasonable solution. Our way is not perfect because it includes the human element, but it works pretty well. Let us suppose that Mr. "A," who has been with the company quite a while, is approaching age 65. Normal retirement age at Northrop is 65. If Mr. "A" does nothing, he will be retired at 65. If he wishes to keep on working, however, he must so

inform his Industrial Relations office and he will be furnished with a form which he will fill out in which he will request continued employment. This form will then be presented to his supervisor and the difficult judgment will be made as to whether or not, in his supervisor's mind, his employment should continue. The form is then processed to the Retirement Board. This board is appointed by the corporation's board of directors to administer the company's Retirement Plans, and is made up of corporate and divisional management people. The board's judgment is final and its general inclination is to continue Mr. "A" at work unless there is a showing from supervision that this would not be the thing to do. In each case many factors are considered, such as the nature of the job, the state of the health of the individual, the fact of whether the work force is expanding or contracting, etc. If Mr. "A's" application is approved, the approval is good for a maximum of one year, when it is again reviewed if he so requests. In short, Northrop has chosen the hard way to reach these decisions, but has also taken the human way. As a result of its policy, while some people have been disappointed there are others now working here who would be retired against their wills in many companies.

There is one further aspect of this problem which might be of interest. Once in a while the company hires back an individual who has already retired. This again requires the approval of the Retirement Board. The board does not look with much favor on this practice and requires a clear showing that a person hired back has a skill which cannot be found in the existing employee body, or is not otherwise available. The board would prefer to see supervision look hard for skills among the present work force. All in all, while there is no right under our plans and policies to work past age 65, and no one should count on it, the prospects of being kept on are reasonably good. The prospects of being hired back after retirement are not so rosy.

On a different subject, one more reminder for the ladies. It is hoped that everyone has seen the notice about the cancellation, effective August 1, of our previous husbands' coverage and that everyone who wants the new coverage on her husband has signed up. If any of our ladies have not been fully informed as to the fact that they may now list husbands under dependent coverage and what this coverage does and does not do for them, they should call their Industrial Relations office or the Group Insurance office—Norair Division, ext. 1210.

## Equal Opportunity Booklet Praised By Vice President

Vice President Hubert H. Humphrey has praised the efforts of Northrop Corporation and several individual employees for their contributions to the publication of a "Plans For Progress" booklet titled "You Too Can Be A Winner."

In a letter to Thomas V. Jones, Northrop president and chairman, the Vice President noted the contributions made and added:

"Please accept my deep appreciation for this effort by your company and extend my thanks to Roland B. Scott for the assistance I am told he provided in producing the booklet."

"Efforts such as this by 'Plans For Progress' companies reaffirm our faith in their interest in making equal opportunities a fact in the lives of all Americans."

The booklet presents, in text and photographs, the experiences of outstanding individuals from minority races who now hold responsible jobs with Los Angeles area firms.

Four Northrop Corporation employees are included. They (See WINNER, page 5)

## Howard G. Rath, Jr. Named Tax Counsel

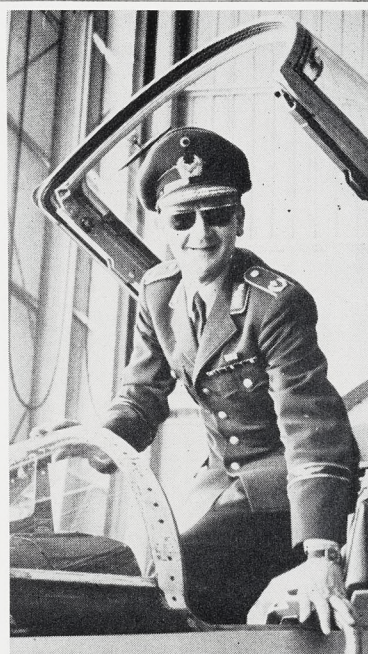
Howard G. Rath, Jr., has been named Northrop tax counsel, it was announced this month by J. Grant Macdonnell, vice president and controller.

Mr. Rath is responsible for review and approval of major tax matters of concern to the corporation. His office is in Beverly Hills.

A specialist in corporation, real property and tax law, Mr. Rath has been associated with the law firm of O'Melveny and Myers since 1958.

He is a graduate of the University of California (Berkeley), where he majored in business administration, and he earned a bachelor of law degree at the University of Southern California.

He is a member of Phi Beta Kappa, the University of Southern California Law Review and the Order of the Coif.



During a recent tour of the U.S. Air Force Flight Test Center, Edwards AFB, California, Brig. General Wilhelm Fahlbusch of the German Air Force visited the Northrop facility at Edwards. General Fahlbusch, chief of advanced plans for the GAF, is shown here in the cockpit of a Northrop F-5 supersonic tactical fighter.

## Quarterly Savings Pass \$8.6 Million

Cost reduction actions reported under the Cost and Management Improvement Program (CMIP) during the first three quarters of fiscal 1966 amounted to \$8,655,260, it was announced recently by Ken Hornor, Corporate Cost and Management Improvement Program coordinator.

Savings to date have come on 943 separate CMIP actions at Northrop's three divisions and Data Processing department.

The total is running nearly \$500,000 ahead of the same period in 1965, when the corporation wound up the year with a total of \$19 million saved.

However, because of a change in the reporting procedure, it is probable that this year's total will fall short of previous annual savings, Mr. Hornor said.

The fourth quarter, which historically has been the most productive period for cost reduction reporting, is being cut one month short this year in order that Northrop may (See SAVINGS, page 4)

## TIME OUT FROM BOEING 747 DESIGN

# Seattle Rolls Out Red Carpet for Stan Murnane Family

They rolled out the red carpet in Seattle, Washington, late last month for Northrop's Stan Murnane and his family.

The occasion was, Mr. Murnane reports, "Interesting, exciting and rewarding."

Mr. Murnane heads stress activities for a Northrop Norair work force of approximately 90 engineering personnel who are working closely with Boeing Company engineers in preliminary design work on the Boeing 747 program.

This group is carrying out early Northrop commitments on a program which calls for Northrop to design and fabricate a substantial portion of the fuselage for the 490-passenger commercial aircraft. Later they will return to Hawthorne to guide engineering groups responsible for detail design activities.

The Seattle Chamber of Commerce selected the six-member Murnane family to help open the Seattle Center. This Center, once the heart of the Seattle World's Fair, features art, science and sports facilities, plus the famed Space Needle restaurant and observation tower.

After breakfast in the Space Needle, the Murnanes were featured on a television program, a radio interview, then shown about the center by a group of girl guides who handle crowds during summer months.

"We were all quite pleased with the

attractions and look forward to revisiting them later this summer at a more leisurely pace," Mr. Murnane said.

Since settling in Washington for the summer, the Murnanes have acquired a house on Mercer Island and a 14-foot speedboat which is now the family fun

center. They all ski and make excursions up and down 20-mile long, six-mile-wide Lake Washington.

"Many of the Norair men here have brought their families along with them and enjoy the opportunities for outdoor fun," Mr. Murnane said. "Novel to us all is the fact we can drive about 15 minutes in any direction and suddenly we are in the wilderness."

Designer Al Pierce and his family recently departed on a combination boat and rail trip up through Canada to Alaska as a vacation junket.

And Bill Hickie has acquired a sea-plane in which he flies to the many lakes and rivers in the area for sports fun.

Mr. Murnane reports a very close and cooperative working relationship with Boeing Company people whom he describes as "really wonderful to know."

"Most of us have just gotten settled down and our families located," Mr. Murnane said. "We are beginning to exchange social visits with our Boeing friends and all of us are looking forward to a busy, but interesting, summer up here."



TOURING SEATTLE CENTER—Norair's Stan Murnane and family are shown with guides and Chamber of Commerce officials as they tour Seattle Center. Murnane family was selected from among Northrop people working at The Boeing Company.

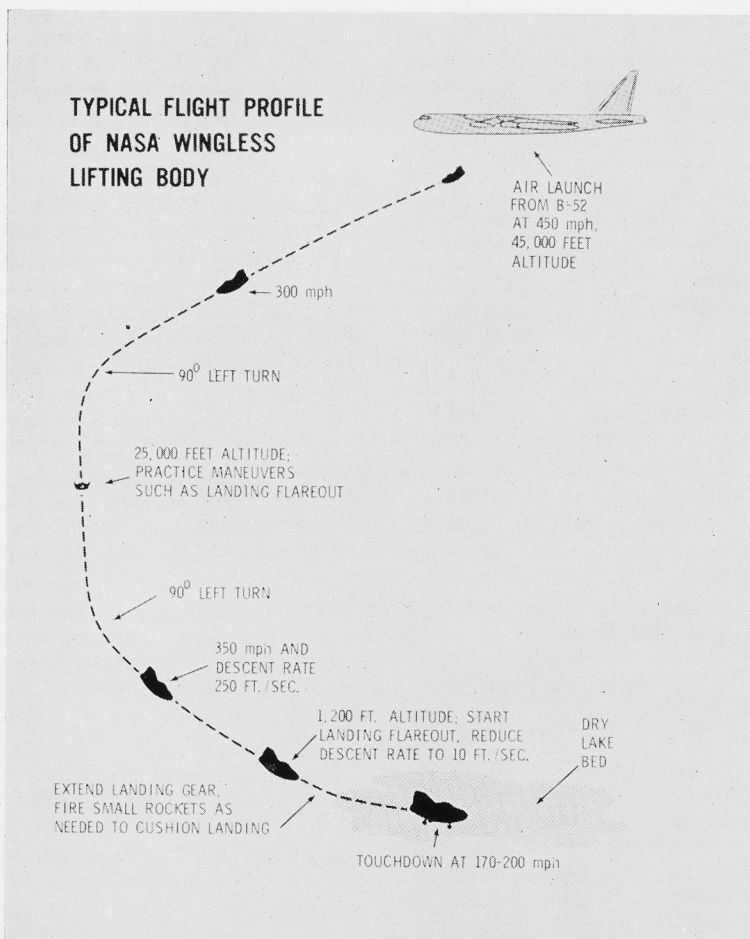




Final moments prior to first free glide flight of Northrop-built M2-F2 lifting body found Pilot Milton O. Thompson in conversation with NASA technician as B-52 crew members make inspections.



NASA Pilot Milton O. Thompson enters M2-F2 cockpit (left photo) and minutes later a ground crew member guides B-52 out of its parking spot. Early morning sun silhouettes M2-F2 under wing. After 20-minute climb to 45,000-foot altitude, M2-F2 was launched for a controlled flight to earth in just 3 minutes, 37 seconds. Flight was first of an all-metal lifting body.



## LIFTING BODY: New Re-Entry Concept

(Continued from page 1)  
Apollo lunar exploration program.

In mid-1964 Northrop Norair began work, under contract to NASA, on two lifting body research vehicles, the M2-F2 and the HL-10. The former was delivered in June 1965 and the latter in January 1966.

A special Norair task force working under Director Ralph Hakes provided structural and system design required and then fabricated both vehicles.

Since that time both vehicles have gone through extensive wind tunnel test programs at NASA's Ames Research Center.

Planned flight test programs for the two vehicles are essentially the same.

Prior to its July 12 free-flight, the M2-F2 was put through a series of captive flights and ground runs. High-speed taxi tests were made with the M2-F2 mated to the B-52

with a special Northrop-produced pylon adapter. Another series of taxi tests, using its own landing assist rockets for power, were made to demonstrate the M2-F2 steering and brake effectiveness of the landing gear. This was followed by two complete systems check-outs in captive flights with the M2-F2 mated to the wing of the B-52.

The July 12 free-flight operation was conducted shortly after dawn to avoid hazardous desert winds and thermals or updrafts usually present later in the day at this time of the year.

Following an intensive check out routine on the ground, the B-52 took off for a circular 20-minute climb to altitude. Mr. Thompson was busy in the M2-F2 cockpit carrying out pre-launch checks, including test bursts of four rocket engines which can be used in final approach to cushion the landing.

They were not used.

Mr. Thompson launched himself in a straight-ahead glide and then executed a 90-degree turn left. To observers on the ground he appeared to be plunging earthward at an excessive speed. However, the M2-F2 was under full control at all times. On this leg, Mr. Thompson performed a practice landing flare at about 25,000 feet and briefly ignited his rockets.

He then went into a second 90-degree turn left and was on his final approach. His top free-flight speed after launch was about 320 miles per hour. Approximately 1200 feet above the dry lake bed he began a second flare maneuver to slow his rate of descent. He skimmed low over the runway, lowered his landing gear, then touched gently down at a speed of about 195 miles per hour and rolled to a stop.

Northrop Photos  
by Sam Orr  
Flight Profile  
by NASA



News representatives covering first flight of M2-F2 listen carefully to playback of conversations recorded during flight (above). Television cameras grind as NASA Pilot Mil-

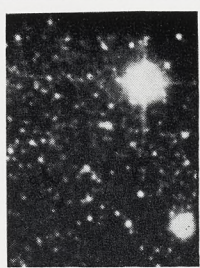
ton O. Thompson describes first flight (right) and NASA Flight Research Center technicians conduct close post-flight inspection of the M2-F2.





## AD ASTRA PER ASPERA

## Aerospace Physiologists Elect Dr. Lombard Charter Chairman



By the Northrop News Staff

Dr. Charles F. Lombard, who has spent the past 25 years in making flight safer for man, is the first chairman of the newly formed Aerospace Physiologist section of the Aerospace Medical Association.

Dr. Lombard is head of the Biodynamics Laboratory at Northrop Space Laboratories.

Chartered April 20 during the 37th annual meeting of the AMA, the 70 charter members of the new section also installed Navy Captain Mary Keener, chief of the Bureau of Medicine and Surgery's physiology section, as vice chairman; Air Force Lieutenant Colonel James W. Evans, aerospace physiologist in the Office of the Surgeon General, as secretary-treasurer; and Navy Captain W. E. Goldenrath, aerospace physiologist at North Island Naval Air Station in San Diego, as bibliographer.

"Everything is so new," Dr. Lombard said this week, "that we are still in the process of forming committees and making plans which will ensure the proper growth of the section. "Physiologists, by far, make up the largest single portion of the Aerospace Medical Association and up to now have been the only group which did not have its own section. I am confident that this new organization, as a forum for expression and exchange of ideas, will play a significant role in the further advancement of space medicine."

Dr. Lombard has been a member of the Aerospace Medical Association since 1942. His highly productive career, which includes numerous inventions and technical publications, encompasses the university, military and industry approach to physiological research.

At Northrop since 1960, Dr. Lombard set up the Biodynamics Laboratory in 1962. His staff presently numbers about 30 engineers, scientists and technicians.

"There is a tremendous number of specializations within aerospace physiology," says Dr. Lombard, "and one of the objectives of the section will be to improve communications on important achievements at the university, within the military and government agency laboratory and in industry."

(At NSL, the emphasis is on the physiology of stress and the development of equipment to protect the human organism from the dangers of stress. The three major types of stress under study are acceleration, thermal load and changing atmosphere.)

It is possible there are some aerospace physiology circles in which Dr. Lombard is not personally known, but there are few to which he has not contributed.

In 1961, he headed a committee which devel-

oped, for the Aerospace Industries Association, the first recommended safety practices for manned space chambers. The committee's report was accepted by the National Standards Association.

In 1950 he headed another AIA committee which developed safety standards for low pressure chambers.

Animal lovers throughout the world are indebted to him for his studies on euthanasia, which determined that the most humane method of disposal of unwanted animals was by placing them in a chamber and lowering the pressure to the equivalent of 55,000 feet altitude.

He developed the Lombard Oxygen Therapy Mask during a pneumonia epidemic several years ago when people were dying because there weren't enough oxygen tents to go around. It worked so well, there are few oxygen tents around.

With H. P. Roth, who is now a consultant at Northrop Space Laboratories, he developed the crash helmet which supersonic aircraft pilots wear today.

At the University of Southern California, Dr. Lombard received both a bachelor's degree in physics and a doctorate in pharmacology and physiology. He later was an associate professor in the USC School of Medicine.

A lieutenant colonel in the Air Force Reserve, he served two tours of active duty, where he conducted physiological training, proof testing of personal equipment and survival gear and crash injury research.

## Vietnam Air Symposium

One of the most complete and accurate reports to date on the air war in Vietnam was given not too long ago at a symposium sponsored by the Air Force Association (AFA) during its national convention at Dallas, Texas.

It was the first public and unclassified presentation to cover the full spectrum of the USAF effort.

While the symposium was rather extensive in its content, perhaps a good summary would be two quotes from two of the principal figures.

According to Lieutenant General Sam Mad-dux, jr., vice commander in chief of the Pacific Air Forces:

"While this conflict has often been called a ground war, it would be more accurate to call it a dramatic demonstration of the margin of difference air operations provide against guerilla attacks in support of ground operations in a limited war environment.

"I do not say that airpower alone will win the war, but I do say that without airpower we most certainly would lose."

(See AD ASTRA, page 5)



Mr. Alison

## WESTERN MOTIF ADOPTED BY NRC FOR FAMILY PICNIC

Get 'em up, get 'em moving, pardner, it's "Roundup Time."

This old-fashioned call, the call of the trail boss, was echoing throughout Northrop Corporation this week as plans move ahead for staging the first all-Northrop family picnic in two years.

The date: Sunday, August 28. The place, Los Angeles County Fairgrounds at Pomona.

That's when Northrop Recreation Clubs pool their talents to bring Northrop families a full-day of fun, beginning at 10 a.m. and continuing until 7 p.m.

Everyone is invited and just about everything is "on the house"—rides, games, fun, entertainment, prizes and surprises. There will be nominal charges for food items, but soda pop, ice cream and other items will be distributed without charge. And there is no admission charge.

Long one of the favorite annual get-togethers for Northrop families from all divisions, this event was last held in 1964. It is being resumed this year by popular request. And it has been scheduled in the waning days of summer, just before winter activities begin.

This year the sponsoring NRC Councils have selected a western motif and a western theme, "Roundup Time." Those attending are invited to don their best jeans and western regalia and join the fun.

More information about the many events will be forthcoming. Right now the important thing is to reserve the date, August 28, your date for "Roundup Time."

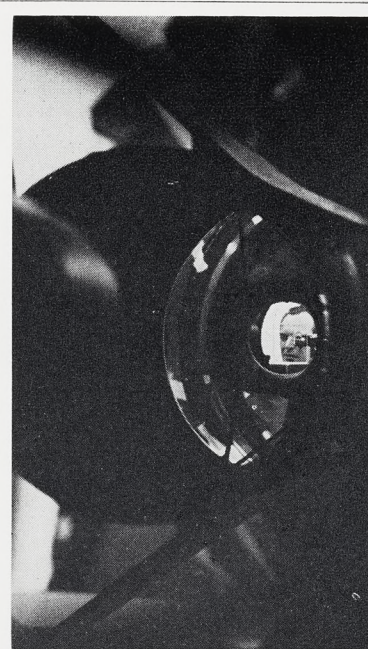
## SAVINGS

(Continued from page 2)

change its CMIP reporting period to coincide with that of the government's fiscal year.

Northrop's fiscal year ends on July 31, while the government closes its books for the year on June 30. Fiscal 1967 began July 1 for Northrop's CMIP reporting, resulting in the shortened fourth quarter.

The change in reporting periods applies only to CMIP. Regular financial reporting will continue on the August 1 to July 31 basis.



Peering through open end of ALOTS exterior pod, this Northrop Nortronics technician inspects optical system which is now in operation by U.S. Air Force Eastern Test Range for all-weather tracking of missile and space shots.

## Local Rice Alumni Elect Martin Gould

Dr. Martin J. Gould, program scientist for Northrop Space Laboratories' Apollo Experiments Pallet study, has been elected president of the Los Angeles Rice University Alumni Club.

Located near NASA in Houston, Texas, Rice University is actively engaged in space research

programs. NSL recently developed a spacecraft structure for Rice to house its "OWL" satellite, scheduled for launch in the near future.

"Though traditionally a limited enrollment school, Rice is currently engaged in a \$33 million expansion program," Dr. Gould said, "and along with alumni groups throughout the country we will be assisting in fund raising."

George Brown, president of Brown and Root, Northrop's partner in a joint venture at the Manned Spacecraft Center in Houston, is chairman of the expansion program.

Although Dr. Gould earned his doctorate in applied geophysics from the California Institute of Technology, he is an alumni of the University where he received both his bachelor's and master's degree in physics and nuclear physics, respectively.



Dr. Gould

## WEST COAST DIVISIONS ASSIST

## Carolina Opens Propulsion Systems Test Control Center

Northrop Carolina this month opened for business an automated control and data acquisition center to support static tests of rocket propulsion systems at its Asheville, North Carolina plant.

During development phases of propulsion units, the new facility will be used by the ordnance manufacturer somewhat like a wind tunnel is used by aircraft developers. However, the facility will serve in testing production items as well as designers' concepts, according to Ken Kirkland, test manager.

The rows of switches, relays, lights, oscillographs, and such, which panel the 14 by 18 foot control room, are of an inexpensive, special purpose design. The project employed the assistance of engineers and technicians from Northrop's Norair and Nortronics Divisions at Hawthorne.

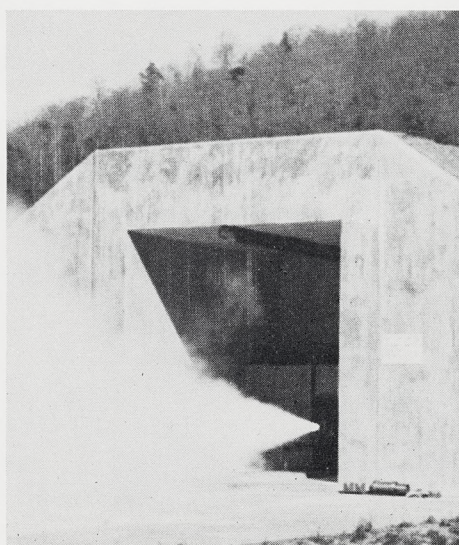
"Remarkably, it was designed and built in six months," Mr. Kirkland said.

The system has a capability of handling approximately 80 data channels including 24 resistance bridge transducers, 40 thermocouples, and 15 event channels, in addition to timing, ignition and miscellaneous data events.

Two of the most potentially rewarding rocket development programs being tested are the controllable solid rocket, which can start, stop, throttle and restart on command, after the combustible rocket, which reduces itself to a harmless ash after it fires.

Northrop Carolina short-duration ejection motors presently are used on Polaris, Atlas F, Titan I, and Titan II and Minuteman missiles.

Another product of the broadly diversified subsidiary which will be tested in the new control center is its line of gas generators, presently being produced for missiles. Ultra high-pressure gas generators are currently in development.



In secluded valley, more than a mile from main plant, Northrop Carolina conducts tests.

While the control center is comparatively simple, it can handle some special tests extremely short in duration (action time in milliseconds) which compares with the most ultra-modern centers, Mr. Kirkland said.

Assisting Mr. Kirkland and Senior Engineer Bert Morgan in the buildup, installation and checkout of the system were engineers Harold Bigelow of NSL and Tom Klouse of Norair, and technicians Maurice Burke, Hank Laster, Bill Pedersen, and J. C. Stephens of Norair.

Nortronics Hawthorne furnished technicians Jim Rheins and Bill Wall of Computer Test group and John Phillips, associate engineer of Subsystem Test group.

Northrop Carolina technicians who participated in the team effort were Norman Miller, Jim Elmore, Bob Davidson, Bill Weaver and John Gaidin.



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

**For Sale**

**Organ**, Thomas chord, elec., full size, walnut finish, bench & all music incld., \$300. Downey, TO 9-7410. A

**Refrigerator**, Servel, gas, white, 10 cu. ft., \$50. Torrance, 371-9651. A

**Wedding Dress**, worn 2 hrs. in May, white, size 8, scalloped neckline, full length, chapel length train, \$25. Gardena, DA 9-9046. A

**Skis**, 7', 1 pr., steel edges w/poles & tobagan, 6', used twice, \$10. San Pedro, FR 2-6585. A

**Poodle**, AKC reg., black, male, toy, \$50. Norwalk, 864-7673. A

**Chevrolet**, 1957, 2-dr., new paint & starter, needs tune-up & tires, \$185. Torrance, 835-5708. A

**Tuner**, Motorola FM, \$40. Panorama City, 894-3244. A

**Chevrolet**, 1959 Bel Air, 2-dr. sedan, \$399. Inglewood, 674-1847. A

**Movie Camera**, 8 mm, Mansfield Holiday autc., zoom lens, pistol grip, leather carrying case & tripod in case, used 3 times, \$60. Box 1401. A

**Boat**, 14' w/30 h.p. Johnson eng., \$350. Playa del Rey, 823-2238. A

**Piano**, Horace Waters & Co., upright, grand, mahogany, 5' wide, 4 1/2" high, 3 pedals, deliver if reasonable distance, \$175. Torrance, 325-3404. A

**Impala**, 1964, 2-dr. h/top, r/h, Vibrasonic, auto. trans., s/belts, 27,000 miles, \$1900. El Segundo, 322-4130. A

**House**, 3-bdrm., 1 1/4 bath, dble. gar., fenced yd., sprinklers, newly painted, 5 mins. from Northrop, \$23,995. L.A., PL 7-3595. A

**Dresser**, Danish walnut, white top, 4 yrs. old, \$40. Torrance, 375-2018. A

**Austin Healey**, 3000 MK III, 1964, 4-spd. & o.d., \$2350. Redondo Bch., 379-7567. A

**Square Dancing Dress**, blue & white checked gingham, worn once, size 12, \$8. Hawthorne, OS 9-6334. A

**Sailboat**, Columbia 15, complete w/dacron sails, whisker pole & boat cover, \$995. Garden Grove, 714-531-5391. A

**Hearing Aid**, glasses or Zenith behind-the-ear type, used twice, either type \$185. L.A., AX 1-6653. A

**Range**, gas, copertone, 1 1/2 yr. old, center grill, \$100. Torrance, 325-9817. A

**China**, Easterling, damask pattern, 4 5-pc. place settings, plus creamer & sugar, platter & lge. bowl, open stock, \$80. El Segundo, 322-0678. A

**Jigsaw**, 18" throat, 12" table, hvy. duty motor & stand, extra blades, \$25. Inglewood, PL 5-4497. A

**Hair Dryer**, professional studio-type, \$70. Inglewood, 672-7424. A

**Shotgun**, Higgins 12-gauge auto. w/raised rib & Polychoke, \$60. Hawthorne, OS 5-0667. A

**Bicycles**, Schwinn or Murray, 24" boy's, \$10. P. V. Pen., FR 7-5853. A

**Trailer**, 10' teardrop, new tires, \$150. Gardena, DA 4-0449. A

**Dishwasher**, portable-type, Kitchen Aid, never used, still crated, \$100. Manhattan Bch., 788-7519. A

**Surfboard**, Bing, slight nose damage, repair kit incld., \$40. Hawthorne, 644-2592. A

**Wire**, 5/8" mesh, 4 lengths, 10 1/2' long, 2 3' high, 2 2 1/2' high & lumber, \$10. Hawthorne, OS 6-0041. A

**Impala** sport coupe, 1958, 345 cu. in., V-8, chrome reverse rims, \$795. Lynwood, 632-2642. A

**Mattress**, twin size, Englander 1020, ortho super-firm, \$25. Hawthorne, 675-5802. A

**Ford Fairlane**, 1955, r/h, V-8 engine, \$150. Torrance, 371-1949. A

**Range**, Frigidaire elec. 30", \$40. Torrance, DA 6-1999. A

**Pickup Truck**, 1962 Chevrolet, 3/4-ton, lge. bed, 6-cyl., stick, r/h, hvy. duty rear axle, low mileage, \$1195. Bell, 581-5208. A

**Impala**, 1960, convt., new paint, auto. trans., w/w, \$500. Gardena, 776-6627. A

**Karmann Ghia**, 1965, deluxe-model, wooden steering wheel, r/h, w/w tires, \$2395. Torrance, DA 9-9670. A

**Dresser** w/mirror & 2 night stands, white, modern, \$25. Inglewood, 677-9333. A

**Stove**, 2-burner elec., \$10. L.A., 472-3374. A

**Refrigerator**, Crosley Shelvador, white, \$45. Torrance, DA 3-8797. A

**Camper**, for stepside Chevrolet pickup, 1/2-ton, \$50. Redondo Bch., FR 2-5310. A

**Pontiac Catalina**, 1963, w/w, r/h, \$1595. Whittier, 944-5623. A

**Travel Trailer**, 16' Shasta, many extras, \$800. Torrance, DA 6-5566. A

**American Rambler**, 1957 Cross Country, \$200. Gardena, OS 5-2159. A

**MG**, 1963 sports car, good cond., \$1100. Gardena, 329-5006. A

**Acreage**, 116, 16 fwy. miles east of San Diego, \$495 acre. Costa Mesa, 642-0614. A

**Tent**, 9'x14', umbrella-type, no center pole, Sears, w/integral floor, \$25. Box 1402. A

**French Poodle**, miniature, female, 3 mos. old, white, housebroken, \$50. Box 1403. A

**Organ**, Lowrey, theatre spinet, model H, consider free equity to responsible party, warranty in effect, \$1900. Manhattan Bch., 374-5635. A

**For Sale**

**Lawnmower**, hand-type, 14" ball bearing, 1 yr. old, \$8. Hollydale, ME 3-2395. A

**Volvo**, 1958, \$175. Hawthorne, 674-1885. A

**Roller Skates**, girl's, size 8, worn 3 times, \$10. Lawndale, 676-9996. A

**House**, 2 on large lot, 4-bdrm. & 2-bdrm., \$35,950. Inglewood, OR 4-6386. A

**Sailboat**, 19' Lightning class, trailer, dacron sails, \$575. Hawthorne, 675-6963. A

**Bed**, dble., eastern hardrock maple, bookcase type headboard w/2 drawers, footboard, box springs & mattress, \$50. Torrance, 323-1400. A

**Ford**, 1955 2-dr. Crestline, good eng. & tires, \$150. Torrance, 324-6488. A

**Pickup**, 1956 Ford 1/2-ton, 1958 eng., 6-cyl. stick, \$350. Inglewood, 674-7301. A

**Darkroom Equip.**, complete, Opemos enlar., 11"x14" trays, poly con filters, \$100. Hawthorne, 671-0087. A

**Ford**, 1959 2-dr. h/top, 352 cu. in., slicks, \$450. Hawthorne, 679-2006. A

**Table Lamp**, tall, white ceramic base, white shade, \$15. Fullerton, 714-526-1521. A

**Bedroom Set**, \$50. Buena Pk., TA 7-1352. A

**Washer**, auto. Kenmore, 1960, modern fabrics cycle & lint filter, \$25. Hermosa Bch., 374-5425. A

**Mercury Monterey**, 1965, h/top, r/h, auto. trans., p/s, p/b, factory air cond., \$2750. Costa Mesa, 714-546-5341. A

**Guitar**, classical-type, Mexican import, \$60. Costa Mesa, 714-549-1760. A

**Hi Fi**, Webcor, 4-spd., auto., mahogany cabinet, \$19. Hollywood, 657-2642. A

**Sofa**, lux. Mediterranean, 9', olive green & black, quilted & Scotch Guarded, cost \$690; \$395. Marina del Rey, 823-2655. A

**Crib**, deluxe Edison, bow front, wax birch, plus Kantwet mattress in zipper cover, \$19. Torrance, 323-8089. A

**Chevrolet**, Super Sport, 1964 convt., V-8, 327 cu. in., 4-spd., r/h, new tires, \$1800. La Habra, 691-5166. A

**Honda**, 1965 CB160, less than 2000 miles, \$495. Redondo Bch., FR 8-5078. A

**Wedding Dress**, long, w/train, 8 mos. old, \$65. Long Bch., GA 6-6274. A

**Buick Skylark**, 1962 coupe, 8-cyl., 38,500, p/s, r/h, orig. owner, \$1325. Pac. Palisades, 474-4667. A

**Console Hi-Fi**, Dynaphone radio-phonograph-microphone-amplifier, for electric guitar, \$60. Hawthorne, 676-0418. A

**Ford Fairlane**, 1963 h/top, 2-dr., 263 h.p., standard trans., p/s, good w/w tires, take over \$52.50 mo. pymts., \$900. Downey, 923-2533. A

**Chevrolet**, 1956 station wagon, 4-dr., V-8 eng., p/b radio, hvy. duty heater, new w/w tires, battery & rebilt. trans., 1-owner, \$375. P. V. Estd., 375-3902. A

**House**, 3-bdrm., many custom features, landscaped, sprinklers, extra lge. gar., 1 1/2 miles from Ventura Division, \$22,500. Newbury Pk., 498-3043. A

**Volkswagen**, 1963 9-pass. bus, good condition, \$950. Lakewood, 633-6561, 630-4368. A

**Poodle**, silver, male, miniature, 2 yrs. old, housebroken, all shots, AKC papers, \$30. Long Bch., 596-9748. A

**Range**, O'Keefe & Merritt, gas, griddle grillvator \$60. Hawthorne, 679-2983. A

**MG**, 1958, wire wheels, needs minor body work, \$450. Torrance, DA 4-8663. A

**House**, 4-bdrm., fireplace, 1 1/4 baths, screened in alum. patio, unusual kitchen, Medallion home, fenced yd., 3 1/2 yrs. old, \$26,000. Torrance, 834-2175. A

**Tube Tester**, Hickok model 533P mutual conductance, \$22. Gardena, DA 4-7097. A

**Car Radio**, Motorola FM900, complete kit except for rear speaker, 1 1/2 yr. uncond. warranty, \$70. P. V. Pen., 377-7241. A

**Volkswagen**, 1965, push-out rear windows, 14,000 miles, \$1545. Inglewood, PL 6-7337. A

**Pickup**, 1964 Econoline, w/camper shell & new 14" prem. tires, \$1100. Lakewood, 865-8009. A

**Olds F-85 Cutlass**, 1963, p/b, p/s, w/w, radio, turbo Hydramatic, new tires, \$1595. Manhattan Bch., FR 2-4324. A

**Refrigerator**, GE, small freezer, \$30. Torrance, FR 5-2929. A

**T-Bird**, 1962, p/s, p/b, p/seats & windows, air cond., \$1850. Redondo Bch., 370-0157. A

**Encyclopedia**, Collier's, 1966 ed., 24-vol. & Junior Classics, 10 vol. reference service & Yearbooks until 1976, \$350. Hawthorne, 324-7698. A

**Mobile Home**, 10'x50', birch panelled int., fenced patio w/awning, ocean view, Coast Hwy. near Santa Monica, \$4500. Pac. Palisades, GL 4-3642. A

**Volkswagen**, 1964 sedan, w/w, radio, low mileage, \$1275. Inglewood, PL 4-6079. A

**Ford**, 1956, V-8, auto., smog control, \$65. Inglewood, 2-4828. A

**House**, 4-bdrm., family rm., 2 1/2 baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

**Mercedes Benz**, 1963 220S, automatic, p/s, AM-FM radio, \$2650. Newhall, 805-259-2674. A

**Room Cooler**, portable, water circulating, 3-spd., 26"x18"x17", \$50. Rolling Hills Estd., FR 5-8778. A

**Shopsmith**, MK-5, w/jointer & dado, \$200. Hawthorne, 675-9068. A

**For Sale**

**Acreage**, near Willow Springs in Antelope Valley, East Kern Water Dist., 5 to 20 acres, \$495 acre. Torrance, FR 8-1026. A

**Home**, on 1/2 acre, 3-bdrm. & den, 2 fireplaces, covered patio, large pool, \$75,000. Rolling Hills, 532-5005. A

**House**, 3-bdrm., walking distance to Northrop, take over FHA 5 3/4% loan, lge. kitchen, service porch, lge. fenced backyard, landscaped front, R-3 zoning, near schools, \$23,500. Hawthorne, 675-9360. A

**Shampoo & Polisher**, Hoover floor-type, \$20. Torrance, 370-6734. A

**Ford**, 1959, business coupe, 6-cyl., standard trans., w/w, radio, smog device, recent trans. o/haul, \$250. Gardena, 676-0432. A

**Home**, G.I., 3-bdrm., 1 1/4 baths, fireplace, f.a. heat, near Crenshaw-Imperial shopping center & Morningside High, \$26,000. Hawthorne, PL 4-2049. A

**Volkswagen**, 1965, 16,000 miles, \$1550. Torrance, DA 5-7154. A

**Chevrolet**, 1958, station wagon, good mech. condition, large eng., new brakes, auto. trans., \$275. Wilmington, 834-4184. A

**Chrysler Newport**, 1965 2-dr. h/top, p/s, p/b, radio, b/seats, w/w tires, no equity reqd., orig. cost, \$4200; \$2450. L.A., 666-8948. A

**Trailer**, 2-bdrm., 12'x57', \$3500. Long Bch., 428-1789. A

**Honda**, 1962, 305 cc Super Hawk, low mileage, \$400. Long Bch., GA 7-4197. A

**Sofa**, 10', custom-made 4-cushion, never used, \$400. P. V. Pen., 377-7670. A

**Volkswagen**, fiberglass sport body, partially assembled, all fiberglass components necessary to finish, fits VW-1200 chassis only, \$400. Glendora, ED 5-1582. A

**Camping Trailer**, Ted Williams tent-type, used twice, \$275. Inglewood, 754-3582. A

**Cabin**, 2-bdrm., at Big Bear Lake, partially finished inside, \$10,950. Fullerton, 714-525-1677. A

**Box Mirror**, maple finish, \$20. Torrance, 371-5916. A

**House**, 4-bdrm., 2-story, 2250 sq. ft., fireplace, family rm., 2-bath, insulated, lge. patio, landscaped, fences, sprinklers, 1 1/2 yr. old, all bltins, assume 6 1/4% loan, \$2700 dn., \$30,000. Dominguez, 632-4978. A

**Cooler**, Bon-Aire, for home & auto, 6 volts, never used, \$25. Downey, TO 2-3310. A

**Organ**, Hammond M-3 spinet w/percussion, unmarred maple finish, \$795. San Pedro, 831-5837. A

**Comet**, 1962 sports model, b/seats, r/h, seat belts, \$725. Anaheim, 714-774-3310. A

**Wanted to Buy**

**Tape Recorder**, portable, high quality battery operated only. Box 1404. B

**Typewriter**, portable, must be in good operating condition. Long Bch., GA 3-1363. B

**Rentals Offered**

**Vacation Cabins**, Lake Gregory & Crestline, make reservations for July thru Sept., \$25 w/ends, \$60 wk. Venice, EX 1-2040. E

**Apt**, girl wanted to share 2-bdrm., furn., util. pd., \$65 mo. Hollywood, HO 4-1084, AT 4-5698. E

**House**, 3-bdrm., unfurn., gar., lease 1 yr. front yd. & patio, pets & children OK, \$150. Torrance, 654-1724. E

**Duplex**, lge. 2-bdrm., rear, unfurn., h/wood flrs., garb. disp., redecorated, fenced backyard, near schools & shopping, 1 child OK, \$90 mo. L.A., 755-0435. E

**Rentals Offered**

**Apt**, 1-bdrm., unfurn., redecorated, disposal, tile kitchen & bath, child OK, \$80. Hawthorne, OS 5-8335. E

**Apt**, 2-bdrm., garb. disposal, refrig. & stove incld., \$125 mo. Santa Monica, EX 2-2628. E

**Apt**, 1-bdrm., bltins, pool, \$95 mo. Redondo Bch., 376-2117. E

**Cabin**, Green Valley Lake, August reservations open, \$60 wk. Torrance, 324-9478. E

**Cottage**, Ocean Beach, San Diego, make reservations now, \$30 w/nd; \$60 wk. Buena Pk., 826-2007. E

**Apt**, deluxe 2-bdrm., furn., lge. pool, bltins, closed gar., near El Camino, \$140. Torrance, DA 9-5986. E

**Apt**, 2-bdrm., 2-bath, pvt. balcony, dish-washer, soundproof, air cond., sub. parking, fenced yd., children OK, \$155 mo. Inglewood, FR 5-0867. E

**Apt**, 1-bdrm., bltins, lge. sundeck, laundry rm., closed gar., 2 miles from Northrop, \$150 mo. Inglewood, 677-3994. E

**Apt**, deluxe 2-bdrm., bltins, near S. Bay Center, incl. all utilities, \$130. Redondo Bch., 374-5879. E

**Apt**, 1-bdrm., unfurn., \$150 mo. Hermosa Bch., 374-5267. E

**Vacation Cottages**, Idyllwild, sleeps up to 6, secluded, stream, patios, \$20-\$35 w/ends, \$50-\$60 wk. L.A., PL 4-5288. E

**House**, 2-bdrm., unfurn., drapes, h/wood floors, fenced yard & garage., avail. on or about Aug. 1, pets, children OK, \$120 mo. Inglewood, 677-7949. E

**Lost**

**Watch**, ladies' white gold Longines w/6 diamonds, white gold Kreisler corded band, June 30, 3:45 p.m. as leaving Gate 5 going towards Kornblum Ave. via Doty to 126th St., reward. Lost & Found, ext. 1972 or Hawthorne, 644-2845. J

**Personals**

**Shirts**, washed & ironed, .25c. Inglewood, 673-1284. L

**For Sale or Trade**

**Volkswagen**, 1963, many extras, 33,000 miles, 1-owner, \$1100 or trade for pickup truck of comparable value. Laguna Bch., 494-6940. M

Father-Son Team Wins Ping Pong Match

Ed and Dick Mosher, a father-son team, won the all-Northrop family table tennis tournament staged recently at Brookhurst school, Anaheim, by NRC.

Second-place doubles honors went to Jack and David Flannagan. Ten-year-old David was playing his first round of doubles in competition.

Mr. Flannagan copped the senior singles event, downing Miller Ching, Northrop's 1965 singles champ. Don Hall finished third. Junior singles honors fell to Bob Kirkeby with David Flannagan placing second.

AD ASTRA PER ASPERA

(Continued from page 4)

Moderator of the symposium was John R. Alison, a major general in the Air Force Reserve, a former AFA president and Northrop vice president—Customer Relations. Among his pertinent comments were:

"People have said that America doesn't know how to fight the kind of war we are facing in Vietnam. If we don't know, we are learning pretty fast.

"I think we should not forget that we wouldn't have a chance to learn how to fight this kind of war if it weren't for the strategic deterrent which we maintain.

"By that I mean if we did not maintain the strategic deterrent, the Communists would simply take over Southeast Asia.

"If the Communists are successful in making us forget the importance of this strategic deterrent in which America has unquestioned superiority, if they make us forget this for an instant, then the Communists have won a victory."

—Air Force and Space Digest

AIAA Aerospace Sciences

Several Northrop Norair men held key roles during the American Institute of Aeronautics and Astronautics' Fourth Aerospace Sciences Meeting (West Coast) held late last month in

Going my way?

**Rides Wanted**

**7 a.m. — 3:42 p.m.**

**Pacific Coast Hwy. & Calle Mayor**, Torrance. Want ride home only. Alexander Rosin, Norair, ext. 1446, FR 5-3077. 2

**7:30 a.m. — 4:12 p.m.**

**Monterey & 8th St.**, Hermosa Beach. Penny Prouty, Norair, ext. 1456, 2015, 379-8990. 3

**Paramount Blvd. & Florence**, Downey. M. P. Wilson, Norair, ext. 1831, 923-7317. 3

**8 a.m. — 4:42 p.m.**

**Torrance Blvd. & Anza or Anza & 190th**, Torrance. E. Walter, Norair, 371-1420. 5

**Figueroa (Harbor Fwy.) & Anaheim**, Wilmington. Tom Henrich, Norair, ext. 2425, 835-9070. 5

**Bellflower & Stearns**, Long Beach. Occasional ride wanted. Don F. Kesler, Norair, ext. 2061, 596-3691. 5

**Harvester Rd. & Busch Dr.**, Malibu. Except Monday & Friday. Eligio M. Roque, Norair, ext. 2561, 457-7483. 5

**Rides Offered**

**7:30 a.m. — 4:12 p.m.**

**Paramount Blvd. & Florence**, Downey. M. P. Wilson, Norair, ext. 1831, 923-7317. 13

**8 a.m. — 4:42 p.m.**

**Bellflower & Stearns**, Long Beach. Occasional ride offered. Don F. Kesler, Norair, ext. 2061, 596-3691. 15

**Harvester Rd. & Busch Dr.**, Malibu. Except Monday & Friday. Eligio M. Roque, Norair, ext. 2561, 457-7483. 15

WINNER

(Continued from page 2)

are Elizabeth Johnson, Corporate office receptionist; Shiuzo Kitahata, a Norair machinist; Carl Cannon, Norair numerical control machine operator; and Frank Macias, a research biochemist at Northrop Space Laboratories.

Plans for the booklet were formulated at a "Plans For Progress" Vocational Guidance Institute held in 1965. William Larrabee, Northrop vice president-Industrial Relations, was chairman of the industry committee which set up this Institute. Mr. Scott was highly instrumental in organizing the Institute and a subsequent one which ended early this month. He also worked on gathering and preparing information for the booklet.

Northrop Corporation, an early signer of the "Plans For Progress" declaration, has continued to support this vital effort since late 1961. Included was financial assistance for making the two Institutes possible and the publication of "You Too Can Be a Winner."

Los Angeles.

William B. Fallis, chief of the Hypersonic and Lifting Entry Projects, chaired the opening sessions on Entry Vehicles. Janusz Stalony-Dobrzanski, a member of the technical management staff of the same organization, presented a paper titled "Effect of Trajectory Control Scheme on the Performance of Entry Vehicles."

Paul F. Jensen, jr., chief of Research Laboratories, teamed with Victor Zakky, professor of Aeronautics and Astronautics, and Alan Boss, a student, of New York University to present a paper titled "Laminar, Transitional and Turbulent Flow with Adverse Pressure Gradient on a Cone-Flare at Mach 10" during a session on Fluid Dynamics.

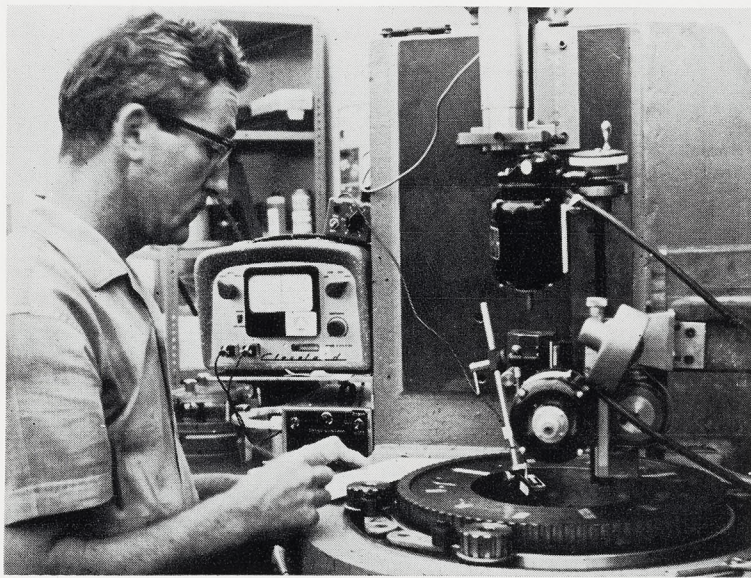
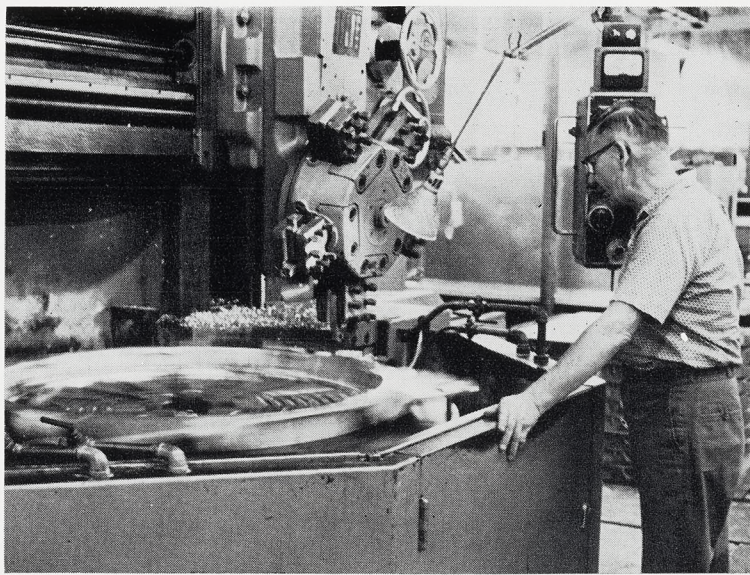
S. H. Levine, head, and R. Lepper, a member of the research staff of the Nuclear Sciences Laboratory, NSL, teamed on a paper titled "Analogue Studies of Magnetic Shields" presented at a Space and Atmosphere Physics session.

Richard E. Horner, Northrop vice president and Norair general manager and past president of the national AIAA organization, was invited to sit at the head table during a dinner session on the first day.

Richard A. Hachten, head of Public Relations at Norair, served as public relations committee chairman for the entire meeting.



Steve Kovach's turret lathe spins in a whirl of motion turning out a support ring for a Hawk missile launcher (right). Ernie Obermayer concentrates (below) as he works with a precision boring machine making a small component for the C-5A navigation system. Large and small components are commonplace sight in busy Nortronics Anaheim Machine shop.



## MACHINISTS

(Continued from page 1)

more in our ranks who can operate any machine in our shop."

In the \$3 million machine inventory maintained at Anaheim are some 250 machines of which 142 are valued in excess of \$5000 each. Included are every type of machine needed for assigned tasks, ranging from standard lathes and jig borers to numerical tape-controlled machines and precision air-spindle boring equipment designed and built at Nortronics.

Six of the latter machines are housed in a special room where temperatures and environment are carefully controlled. They are used for precision jobs and close tolerance work.

Elsewhere, there are profile and duplicating machines of the latest types, numerical tape-controlled machines and other equipment needed to maintain the shop's reputation as the source of most Northrop-required precision machine work.

Currently, the Nortronics Machine shop is operating three shifts with smaller work forces on second and third shifts than on the regular day shift.

One of the most critical needs for personnel at Nortronics Anaheim today is for experienced machinists.

Openings exist for milling machine operators, turret lathe operators, engine lathe machinists and profile machinists.

Employees who may know machinists interested in working at Anaheim, either first or second shift, are invited to contact the Personnel office in Building Y-1.

## CURTAINWALL: Many Applications Considered for New Coating Process

(Continued from page 1)

and in many cases no more than two years.

The result of several years of research, Pac/Weld employs a thermoplastic lineal polyester powder which is sprayed onto preheated metal surfaces with electrostatic guns.

One coat produces a super-strong insulating finish that bonds as well as protects, has lasting color stability against weather and ultra-violet rays, plus complete resistance to corrosion and cracking, to stains and to most chemicals.

The process can be used on virtually any metal product — architectural metals, marine products and such miscellaneous equipment as pipes, signs, guardrails, storage tanks, medical instruments, metal containers, toys, wire products, and so forth.

Pac/Weld is currently being applied to turnpike guardrails for eastern states, industrial electrical conduit for Shell Oil Company and architectural products for Northrop Architectural Systems, a Northrop subsidiary headquartered in the City of Industry.

Goodyear's contribution to the process is the polyester powder, while Pacific Curtainwall developed a mechanized powder coating system, which is capable of handling material sizes up to 32 feet in length, 18 inches in width and five feet in depth.

The Pac/Weld process is considered more economical than

competitive techniques because of its long, maintenance-free service life, its one-coat operation and the fact that it requires no prior preparation, says Joseph M. Druliner, special products manager at Pacific Curtainwall.

Facilities also require less labor and floor space than conventional systems. In addition, more than 90 percent of the spray powder, which is applied in a fluidized state, is recoverable.

One part of the process, high intensity quartz lamp heaters, was developed by Norair's Manufacturing Research and Development section.

Pacific Curtainwall (NORTHROP NEWS, September 8, 1965) has participated in such projects as the Los Angeles Music Center, Los Angeles Department of Water and Power Building and other architectural efforts on an international scale.

## Partner's Best Ball Tournament July 30

A partner's best ball tournament is on tap for Nortronics Anaheim golfers July 30 over the San Clemente Municipal Golf Course.

Initial tee off will be at 11 a.m. The cost, including green fees and prize funds, is \$5.50. Reservations will be accepted until July 22.



## NSL Space Geophysics Lab Probes Moon Composition

How do you determine the mineralogical composition of the moon, when no man has ever been there, or predict its internal constitution from very limited Apollo astronaut data?

How do you predict when and where an earthquake is going to occur — and reduce the ensuing destruction and loss of life?

These are but two of the problems being studied by scientists in the newly formed Space Geophysics Laboratory at Northrop Space Laboratories, headed by Dr. John D. Bledsoe.

Announcement of the formation of the Space Geophysics Lab was made by Dr. J. W. Moyer, director of Physical Sciences. At the same time, Dr. Moyer announced that the Space Physics and Chemistry Laboratory, headed by Dr. K. F. Sterrett, has been redesignated the Physical Chemistry Laboratory.

Analyzing the composition of the moon is one of the four-man lab's current projects, under assignment from the National Aeronautics and Space Administration's office of Advanced Research Technology (OART).

"Since we can't be certain of the actual composition of the lunar surface or its core," Dr. Bledsoe said, "we work with different types of substances which may approximate the lunar conditions—serpentine, basalt, granodiorite, olivine, and chondrites."

In connection with this project, the scientists use Northrop's specialized high pressure-high temperature laboratory (680,000 pounds per square inch at 3600 degrees Fahrenheit) to recreate probable conditions at the moon's core, or deep within the earth's mantle.

Under proposal to NASA is a program to analyze the actual composition of the lunar materials, when Apollo reaches the moon, and astronauts return with actual lunar samples.

"Under that program," Dr. Bledsoe said, "we would analyze the samples to correlate the physical properties with seismic characteristics."

Testing the seismic (acoustic) velocity of a material, Dr. Bledsoe explained, "determines the elastic properties of the rock. It is the only method we have to study the deep interior of the earth or the moon."

"Seismic waves also are used for commercial prospecting for oil or minerals and can be used to locate subsurface layers of rock formation. They have even been used to locate buried masonry walls in archeological explorations of the Vatican."

This type of research ties in with the possibility of predicting earthquakes.

"At the present time," Dr. Bledsoe said, "there is no way possible to predict where or when earthquakes will occur, or what their intensity will be."

"But weather prediction was not considered possible at the time of Benjamin Franklin and was not considered to be particularly accurate as late as the beginning of World War II."

Other fields of study for the Space Geophysics Laboratory are meteorology, volcanology, oceanography, geology, geodetics and seismology.

## Teen Bowling League Under Study by NRC

A teenage bowling league to roll Saturdays at Carter Bowl, Fullerton, this fall is in the offing, according to NRC Commissioner Chet Guzinski.

"Parents may contact Personnel Activities and leave their name and the names and ages of children interested," Mr. Guzinski said. "A league will be formed, if interest warrants."



YEAR TILL CHRISTENING—Bob and Liz Clay pause on bow of their do-it-yourself yacht (left) and dream for a moment about what it will be like when they move their residence aboard ship a year from now. But back to reality (above), they soon resume the current phase—deck sanding—of their four-year project.



## Cadets Give Up Holidays For Studies

Six Air Force Academy cadets have given up their summer vacation — at their request — to study research techniques under guidance of Northrop Corporation industrial scientists in the Conejo Valley.

The cadets are participating in the Academy's Summer Research Program, which was begun in

(See photo on page 6)

industry last year by Dr. Donald A. Hicks, vice president and manager of the Nortronics Applied Research department (NARD).

They began work at NARD late last month and will end their four-week stay there on August 12. Two of the six are 1966 graduates of the Academy, and have been commissioned as second lieutenants. The others are first classmen (seniors). All are science majors.

When the cadets arrived, Dr. Hicks was presented a framed photograph of the Academy's Chapel, in recognition of Northrop's work in support of Academy programs.

The award was presented by Captain John D. Johnston, an Academy mathematics professor, on behalf of Lt. General Thomas S. Moorman, superintendent of the Air Force Academy.

"I should like to thank you," General Moorman wrote in an accompanying letter, "for the excellent support you have given the U.S. Air Force Academy. In particular, I am most grateful for the excellent speakers you have furnished for the Cadet Mathematics Club this past academic year.

"In addition, your participation in the Faculty and Cadet Summer Research Programs has made this an especially meaningful and stimulating activity."

Cadets participating in this year's program are John P. Cerak, Charles A. Denham, Donald

(See CADETS, page 6)

## SCANNING WITH VIGICON



Norton Kinder of Nortronics Palos Verdes sits at the control panel of a Vigicon system, recently installed at the U.S. Navy's Anti-Submarine Warfare School at San Diego. Nortronics officials visited the school recently, inspecting

the Vigicon installation. Similar Vigicon sites are at the Navy's ASW school at Norfolk, Va., and the first Navy underwater test range in the Bahamas. (Other photos on page 3).

## HELICOPTER RIDES ADDED TO AGENDA OF PICNIC EVENTS

Planning a picnic for 5000 to 10,000 people can be frustrating, but fun.

Take, for instance, the ordering — 7500 bags of popcorn, 7500 cups of cola, 5000 hot dogs, 7500 cups of ice cream, three helicopters (four hours each), 12 major midway rides (six hours each), and reservations for two for three days and two nights at a top Las Vegas hotel. There is more, but this covers the major items for now.

Then there are the multiple arrangements involved in scheduling an interdivisional softball game, children's contests (and prizes for them), model airplane demonstrations, square dance

(See PICNIC, page 6)

## NSL Designing Hand Drill For Possible Lunar Use

A battery-powered drill capable of boring nearly 10 feet into the moon's surface is being designed by Northrop Space Laboratories.

The drill, which will weigh approximately 15 pounds so it can be operated by one man, is being designed under a \$75,000 contract awarded to NSL by the National Aeronautics and Space Administration's Manned Spacecraft Center, Houston, Texas.

The three-month design study will be completed late in August, Program Manager John B. Gustavson said. A fully projectized organization has been established within NSL to assure undivided attention to the design study during the critical definition phase.

Mr. Gustavson came to NSL from a project engineering assignment on the Surveyor spacecraft at NASA's Jet Propulsion Laboratory.

The drill, under NASA specifications, would be carried in the Apollo's Lunar Excursion Module (LEM), and could be taken from the ship by an astronaut as desired.

NASA plans call for Apollo astronauts to use the drill to obtain core samples of the moon's crust, and to drill holes in which data-gathering instruments would be placed.

Holes drilled by the proposed tool will be about an inch in diameter. Since core samples are to be saved for biological study and chemical analysis, the drill bits must be hollow, Mr. Gustavson said. Design ingenuity is required to develop a method to retrieve the core samples without contaminating them with earth-based microorganisms.

Mr. Gustavson said NASA specifications call for a drill powerful enough to cut through three feet of granite in 20 minutes.

"The lunar surface may or may not be that hard," Mr. Gustavson said, "but NASA has specified a capability for cutting through various materials ranging from featherweight pumice stone to dense granite."

Project officials said that early designs indicate the drill may look much like a conventional power drill, except for the lengthy bit. It will employ two types of motion — percussive (like a jack hammer) to crush the hard rock; and rotary (like a conventional

(See DRILL, page 6)

## Contract Won For Poseidon ATE Units

Northrop Nortronics has received a contract in excess of \$10 million to develop automatic test and readiness equipment for the U.S. Navy Poseidon missile.

Under the award from Lockheed Missiles and Space Company at Sunnyvale, Calif., prime contractor for the submarine-launched deterrent weapon, Nortronics Anaheim will design checkout systems for missile testing both on land and at sea. The cost-plus-incentive-fee contract, covering a period of approximately 40 months, includes hardware manufacture and test.

Two basic systems, similar to those designed and built by Northrop Nortronics for checkout of the Polaris ballistic missile, will be developed. One will go aboard the submarines for missile systems test to verify Poseidon's operational readiness, and the other will be used for factory and tender ship testing of both components and systems.

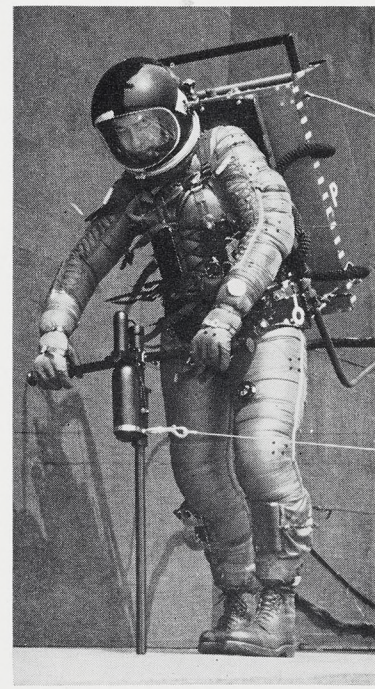
Poseidon is being developed to supplement the Navy's fleet of nuclear-powered submarine weapons systems, and will have at least twice the accuracy and payload of a Polaris.

## Earl Parker Named Public Relations Head

Earl Parker has been named to head public relations activities for Northrop Nortronics, Norman Warren, Corporate director of Public Relations and Advertising, has announced.

Mr. Parker has been with Nortronics since February 1965 as assistant to Richard Hoffman, who recently resigned his position.

Mr. Parker is a 1960 graduate of the University of Missouri School of Journalism. He was a reporter with the South Bay Daily Breeze and the Riverside Press-Enterprise before joining Northrop.



Early prototype model of the Northrop Lunar Drill is undergoing test in the NSL one-sixth "g" simulator facility.

## "BILGE IN THE CREW'S QUARTERS"

## NORVIPS' Voice Is a Real Charmer

Picture an attractive professional singer, walking to the microphone in a broadcasting booth.

She adjusts the microphone, glances at a sheet of paper in her hand and says:

"High bilge in the crew's quarters. High bilge in the crew's quarters."

(See photo on page 6)

That's a more-or-less typical "recording session" for Joan Ririe, one of the voices of Nortronics' NORVIPS Voice Warning Systems.

Mrs. Ririe, a Torrance housewife, has made the warning recordings for NORVIPS for nearly four years. She was picked for the job when a professor at Pepperdine College, where she was studying, told her that Nor-

tronics wanted to hire a woman with a bachelor of arts degree in speech.

Mrs. Ririe went to Nortronics-Palos Verdes, where she and about 200 other job candidates recorded their voices, warning pilots of potential hazards.

She was picked for the job after psychologists and human factors experts decided her voice would be most effective.

Mrs. Ririe's voice, recorded on tapes for submarines, planes, helicopters and artillery systems, has become quite familiar to servicemen, and particularly to pilots.

"One pilot told me that whenever he has to go across the country by himself, he turns on the NORVIPS system so he'll have company," Mrs. Ririe said.

"Sometimes the military and technical terms can be a little confusing. If I don't understand something, I just look for someone who does."

Her voice has been heard on Naval planes and submarines, Air Force B-58's and many other aircraft.

Some pilots who got used to hearing the friendly NORVIPS voice wanted to know who it belonged to.

So Mrs. Ririe, through Nortronics, provided autographed pictures for the curious pilots.

For nearly two years, Mrs. Ririe was a vocalist with Russ Morgan's orchestra, using her professional name, Joan Elms.

She was under contract to MGM for seven years, and has

(See NORVIPS, page 6)



## SECOND FLIGHT COMPLETED

## Re-entry Vehicle 'Unqualified Success'

"An unqualified success."

This was Milton Thompson's ample description of the second flight test of the Northrop-built M2-F2 lifting body carried out July 19.

Mr. Thompson, chief lifting body pilot for NASA's Flight Research Center, was at the controls July 19 as he was one week earlier when the M2-F2 became the first manned all-metal lifting body ever to fly.

Air launched from a B-52 mother ship flying at 45,000 feet above Boron, California, Mr. Thompson put the M2-F2 through a left turn as he passed through 27,000 feet. Four minutes after launch he touched down on the runway on Rogers Dry Lake Bed in a 200-mile-per-hour powerless landing.

Primary purpose of the second flight was a complete systems checkout of the vehicle and to evaluate lateral stability. During the flight, Mr. Thompson performed several aileron maneuvers with some of the electronic control dampers intentionally turned off.

The M2-F2 is the first of two lifting body vehicles built by Northrop for NASA's use in investigating in-flight factors needed for the technological base for the design of future manned spacecraft. The HL-10 is currently at the Flight Research Center where it is undergoing final routines prior to its first flight.

Following his first flight, and just one day before he made his second flight, Mr. Thompson voiced some personal and gratifying praise for the role Northrop and its people have played in developing the two lifting bodies.

Mr. Thompson noted in a letter to Northrop that the first flight of the M2-F2 was, in his opinion, extremely successful."

## Gurnee Appointed Staff Assistant to Thomas V. Jones

William H. Gurnee, jr., has been appointed staff assistant to the president of Northrop Corporation, it has been announced by Thomas V. Jones, Northrop president.

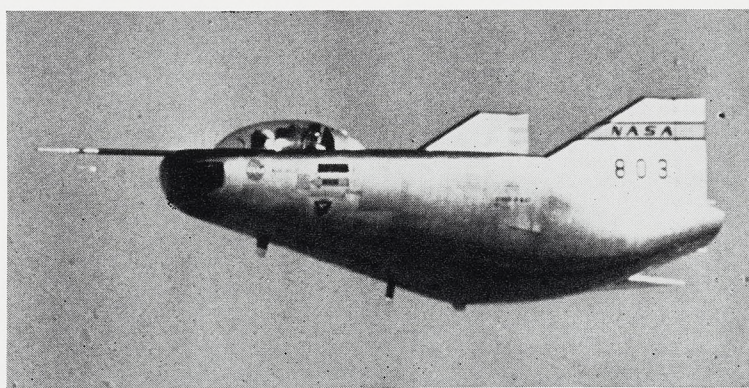


Mr. Gurnee

Mr. Gurnee served in Washington as executive officer to three Assistant Secretaries of the Army between 1958 and 1963 and will act in a similar capacity in the office of the president at Northrop.

Mr. Gurnee was assistant to the senior vice president of Northrop, September 1963 to November 1964, and since then has been with the Logistics Management Institute as senior project director in charge of procurement studies.

He is a graduate of the United States Military Academy at West Point, 1941, the Harvard Business School, 1947, and the Industrial College of the Armed Forces, 1957. Mr. Gurnee retired from the Army with the rank of colonel in 1963.



**M2-F2 IN REPEAT SUCCESS**—One week after its initial flight, the Northrop-built M2-F2 lifting body sweeps down to a powerless landing under steady hand of NASA Pilot Milton Thompson in its second flight. Below are Norair men who played key role in the development of M2-F2 and the HL-10, Dr. Leonard Fowell, manager (left) and Ralph Hakes, director, of the M2-F2/HL-10 Program department.

"At the rollout ceremonies of the M2-F2 last year, each of the project people and Mr. Bikle (Paul Bikle, director of the Flight Research Center) expressed approval of the vehicle and the workmanship visibly apparent," Mr. Thompson wrote.

"As a pilot, I was also impressed but of necessity had to reserve judgement until after a flight. Now that I have made

a flight, I can sincerely say I am impressed. Prior to launch, all of the vehicle systems checked out perfectly, including those supplied or energized from the B-52 through the M-2 adaptor (developed and built by Northrop). At launch, there was not even a momentary interruption of the function of any system, and everything worked as advertised throughout the remainder of the flight.

"More significant, however, than anything I can say about the vehicle, is the fact that we are scheduled for another flight tomorrow (July 19). No changes, modifications, or fixes were considered necessary or made to the vehicle prior to scheduling of the second flight.

"I certainly am impressed with your product and the people who were responsible for the design. I enjoyed working with all of them during the design phase and can not say enough about Mr. (Ralph) Hakes' (Northrop's director of the M2-F2/HL-10 effort) and Mr. (F. R.) Erb's (responsible for mechanical and structural design) contribution to a successful first flight."

## Lupe Zuniga Garners Another Stage Role

Lupe Zuniga, a Northrop Ventura secretary, portrays Tuptim, one of the major figures in *The King and I*, which began last weekend at the Plaza Players Theater in Oxnard.

It will be her fifth production with the Plaza Players. Miss Zuniga has been appearing in light opera for more than six years.

As Tuptim, she sings two solos, "Lord and Master" and "I Have Dreamed," and a duet, "We Kiss in a Shadow."

Miss Zuniga attended Pierce College in Woodland Hills for two years, majoring in music.

The show began Thursday and will play every Thursday, Friday and Saturday through August 6. Tickets may be obtained by calling Miss Zuniga on extension 392.

## IN VIETNAM

## First F-5 Pilot Logs 500 Combat Hours

On his 36th combat mission over Vietnam, Major William H. Gillette, 35, Proctorville, Ohio, became the first Air Force pilot to log 500 hours in the F-5 "Freedom Fighter" while flying a combat sortie.

Assigned to the 10th Fighter Commando Squadron of the 3rd Tactical Fighter Wing at Bien Hoa Air Base, Major Gillette passed the mark on a flight against a Viet Cong concentration in the Mekong Delta, 35 miles southwest of Saigon.

Major Gillette arrived in Vietnam on May 14 after spending two years as one of the original F-5 flight instructors at Williams Air Force Base, Arizona.

"I taught many foreign instructors how to fly this aircraft. We had pilots from Iran, Korea, The Philippines, Nationalist China, Turkey, Ethiopia, Morocco, Thailand, Greece, Norway and Canada. I also checked out a number of senior officers in the bird," remarked the Major.

Commenting on the F-5 in Vietnam, he added, "In combat, the aircraft is a dream. It responds beautifully. On May 25 I was on a flight that was diverted from deep in the delta to Nui Ba Den, 53 miles northwest of Bien Hoa, where a special forces camp was under attack.

Story and photo by USAF



**F-5 PILOT HITS 500TH HOUR**—Major William H. Gillette (left), F-5 pilot with the 10th Fighter Commando Squadron of the 3rd Tactical Fighter Wing at Bien Hoa AB displays Hour Number 500 to his crew chief, TSgt. Haywood Cormier. The 35-year-old fighter pilot from Proctorville, Ohio, became the first Air Force pilot to log 500 hours in the "Freedom Fighter" while flying combat in Vietnam.

"The speed with which we were able to respond, plus the ability of the aircraft to turn tight enabled us to strafe 12 times in a few minutes and turn back the attackers. Our flight accounted for 32 VC killed by air, and the attack was repelled."

Major Gillette mentioned a remarkable aspect of the logging of his 500th hour.

"When I returned from the mission I was met by the same crew chief who met me after my first hour in the F-5, some two years earlier. He is TSgt. Haywood Cormier, 34, of Morris-town, Pa., and as far as I'm concerned, one of the finest in the Air Force. We were at Williams together and he arrived here about two weeks after I did."

The Major joined the Air Force in 1951; has flown a wide variety of aircraft, including the T-6, F8U, T-33, F-94, P-51, F-86, F-100 and the F-5. He also has 19 Atlantic Ocean crossings to his credit.

His wife, Jackie, currently lives in Mesa, Arizona. They have four children, twin daughters, Pennie and Billie, age 8, and sons, Triston, 7, and Bob, 3.

Major Gillette's parents are Mr. and Mrs. R. P. Gillette of Proctorville, Ohio.

## BOARDS APPROVE ACQUISITION OF HALLICRAFTERS

The boards of directors of Northrop Corporation, and The Hallcrafters Company, have approved Northrop's proposed acquisition of Hallcrafters, the two companies recently announced.

Northrop will acquire substantially all of the assets and the liabilities of Chicago-based Hallcrafters for a price of approximately \$13,500,000, subject to completion of an audit in progress, and payable in 385,195 shares of Northrop preferred stock to be issued for the purpose. The purchase price has been reduced from previous figures and reflects a re-estimate of the cost to complete certain contracts.

On this basis, public shareholders of Hallcrafters will receive one share of the new Northrop preferred stock for each approximate 5.6 Hallcrafters shares owned. The members of the Halligan family, who own 50.47 percent of the outstanding Hallcrafters stock, will receive one share of the new Northrop preferred for each approximate 8.1 Hallcrafters shares owned. The Northrop preferred annual dividend rate will be \$1.45 per share.

The transaction is scheduled to be completed following necessary approvals by shareholders of both companies at meetings to be held December 13, 1966.

"We are convinced that there are excellent and growing market opportunities for Hallcrafters programs and products," Thomas V. Jones, Northrop president and chairman, stated. "In addition Northrop's own communications activities will be complemented and strengthened by the Hallcrafters' business, and

(See **BOARDS**, page 5)



## Fortnight in Review

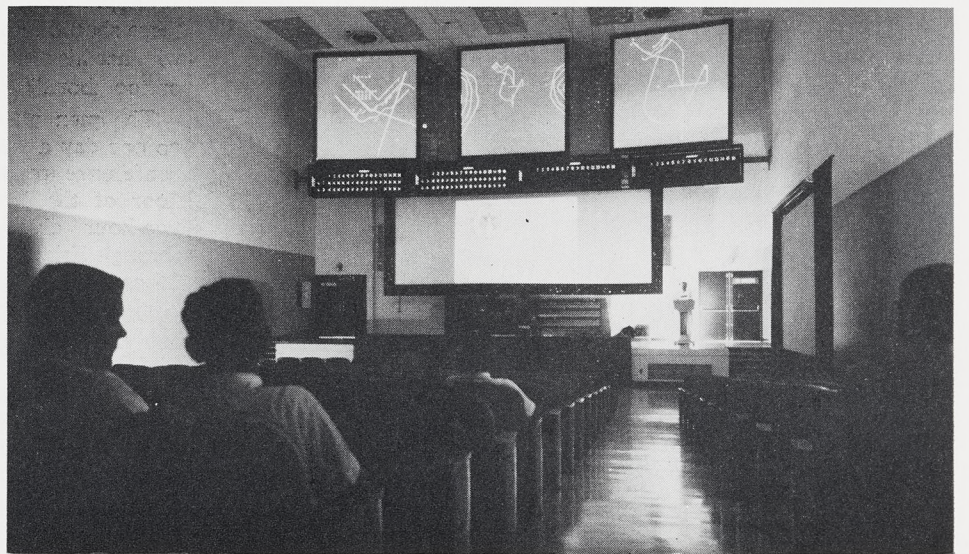
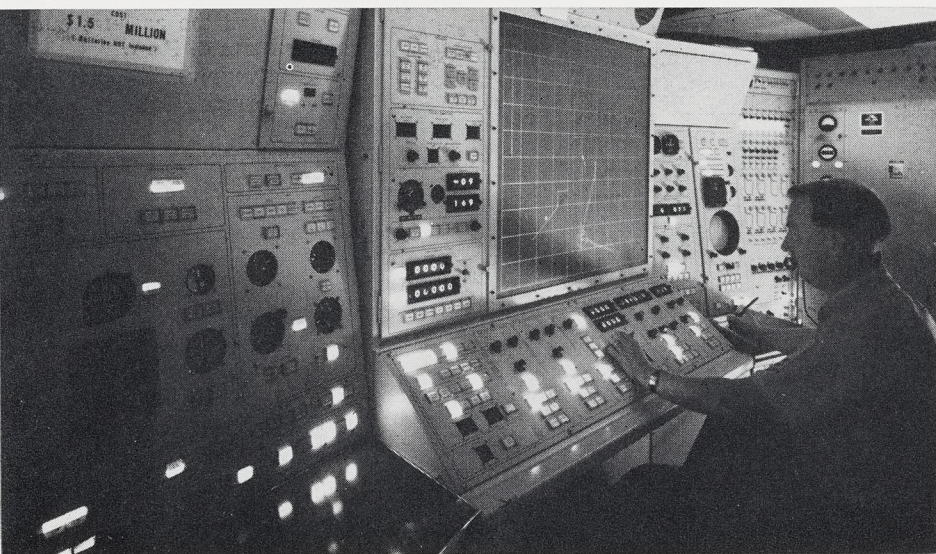
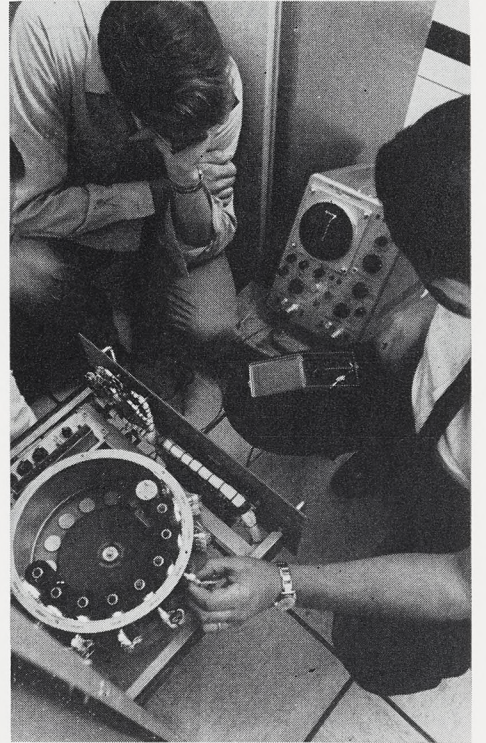
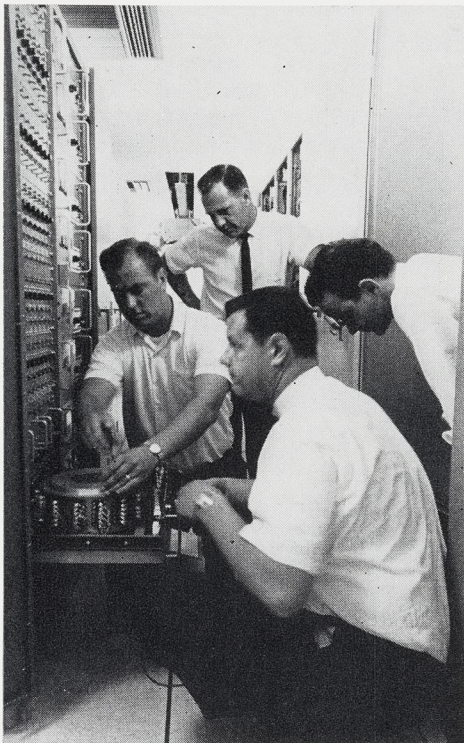
### Kudos For Firemen

What was left of Northrop Norair's historic Plant 3, which was being demolished as part of a modernization program, went up in flames (left and right), but not before the City of Hawthorne Fire Department distinguished itself with an outstanding fire-fighting effort. Not to be overlooked was the prompt, efficient response by Norair's own fire-fighting specialists. The fire, July 20, began among piles of rubble when a tractor hauling a wooden beam with nails in it apparently scraped over a concrete parking lot, causing sparks. Hawthorne Fire Chief William Hartzell directed the fire fighting. Speaking of fires, Northrop Ventura's Fire Brigade recently put into operation a new emergency pump (below, right), which could draw water from ponds around the plant if needed. On the more pleasant side (below), Northrop's entry in the Hawthorne Community Fair parade won first place in the commercial category.



### Graphic Information at Fingertips

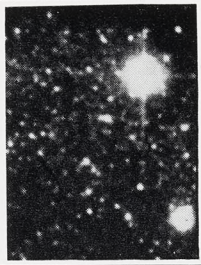
Nortronics personnel joined with Navy and Lockheed officials recently in checking out the newly installed Vigicon system at the Navy's Anti-Submarine Warfare School in San Diego. At left, Nortronics' Chuck Blaney (top) and John O'Connor (bottom) inspect a symbol generator with officials from Lockheed Electronics Company of Plainfield, N. J. At lower left, a Navy operator scans the Vigicon screen, which simulates the movement of ships, submarines and aircraft. At lower right, Nortronics men attended a briefing on the Vigicon equipment at one of the Anti-Submarine Warfare School's three theatre-type screening rooms. And at right, a Lockheed technician checks out the wiring on a symbol generator. The San Diego Vigicon installation includes 24 projection units. A similar Vigicon center is at Naval facilities in Norfolk, Va. A new application for Vigicon is at the Navy's first underwater test range in the Bahamas. Vigicon simulations include telemetry signals, communications transmissions, photographic material and computerized inputs.





## AD ASTRA PER ASPERA

## National, Local AIAA Installs Executives, Honors C.W. Eyres



By the Northrop News Staff

Four Northrop Norair men have been named to national committees and a fifth honored with a special award by recent action of the American Institute of Aeronautics and Astronautics (AIAA).

Charlie Eyres, assistant to the vice president and assistant general manager-Technical, received a "Certificate of Distinguished Service" from the Los Angeles Section of AIAA. It was the first award of its type made by the AIAA and went to one of its most active members. Mr. Eyres has been chairman of the engineering career development committee, secretary of the Los Angeles Section of AIAA and was chairman of two national meetings committees. Last year he was honored for his national educational efforts on behalf of AIAA.

Welko Gasich, Norair vice president and assistant general manager-Technical, is now serving on the important AIAA national Technical Advisory Committee as advisor for aircraft.

Milt Kuska, Norair deputy assistant general manager-Technical, was elevated this year to the chairmanship of the national Management Technical Committee of AIAA.

William Fallis, chief of the Norair Lifting Entry Systems group, was also moved up as chairman of the AIAA Re-entry Vehicles Committee.

Herb Cooles, Norair Research Laboratories Design branch, is a member of the AIAA Technical Committee on ground testing and simulation.

Messrs. Eyres, Gasich, Kuska, Fallis and Cooles, along with many other Northrop Cor-

poration employees, have long been active in AIAA activities.

Mr. Eyres received his award from Win H. Arata jr., outgoing Los Angeles Section chairman. Mr. Arata is a member of the Northrop Corporate Marketing staff. H. F. Mark, assistant to the manager of Marketing at Norair, was installed as the new Section treasurer, and George F. Douglas, Corporate vice president and general manager at Northrop Ventura and a former national committeeman, was named a member of the Section Executive Committee.

### Taylor Heads Alabama AIAA

Ted B. Taylor, assistant to the manager of Northrop Space Laboratories in Huntsville, is the new chairman of the Alabama Section of the American Institute of Aeronautics and Astronautics.

Mr. Taylor, who was installed less than two months ago as vice chairman, succeeds B. F. Beckelman as head of the AIAA's Alabama Section. Mr. Beckelman recently left the Huntsville area, thus creating the vacancy which Mr. Taylor fills.

The new chairman has been associated with Northrop for a year and one-half. He previously was with General Dynamics Corporation as a corporate representative and an electronics engineer. He also served as a research assistant at Georgia Institute of Technology, where he graduated with a B.S. degree in electrical engineering.

Mr. Taylor is an associate fellow in the AIAA and served as secretary to the Alabama Section for two years prior to his election as vice chairman. He also is a member of the Institute of Electrical and Electronic Engineers and the Armed Forces Communications and Electronics Association.

The Alabama Section of AIAA is the largest technical society in the state. Its 1100 members include many senior aerospace scientists and engineers in both government and industry.

### Radiation Effects

Scientists from the Nortronics Applied Research department (NARD) in Conejo Valley have presented four papers at the annual Institute of Electrical and Electronics Engineers convention on Nuclear and Space Radiation Effects.

The five-day conference (July 18 through 22) was held at Stanford University in Palo Alto.

The four papers were among 45 presented from more than 150 which had been submitted

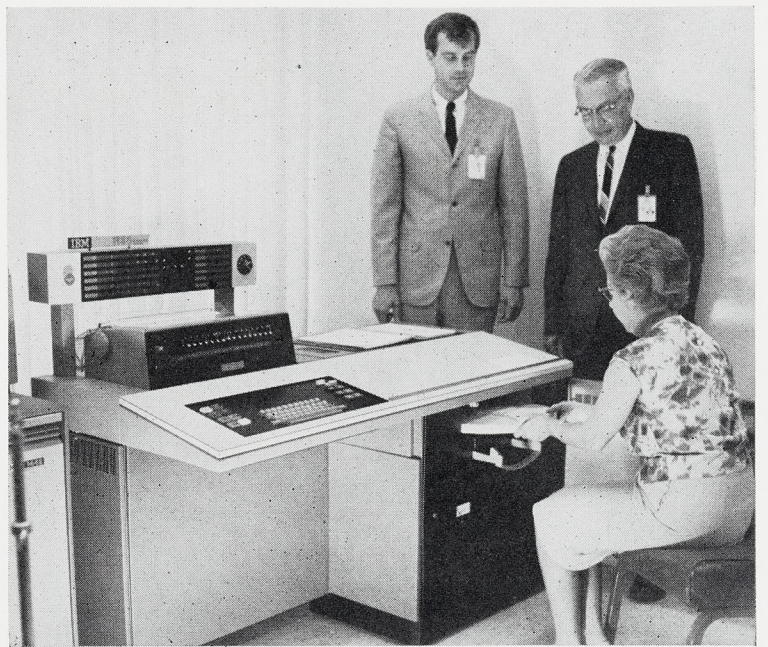
(See AD ASTRA, page 5)



Mr. Taylor



Charlie Eyres (left) receives AIAA certificate of distinguished service from Win Arata.



IT'S THE FIRST—Mrs. Mary Cooper inserts data into an IBM 1130 computer at Northrop Space Laboratories Huntsville department, the first IBM 1130 in the Huntsville area. It was recently delivered. With her are J. A. Barclay (right) Huntsville manager, and Fred Roberts, programming coordinator.

## NSL Huntsville Installs IBM Computer System

The first IBM 1130 computer system installed in the Huntsville area was recently delivered to the NSL/Huntsville department. There it will serve the needs of the department for business data processing as well as supplement the more sophisticated computing capability available at the Computing Lab of Marshall Space Flight Center (MSFC).

This is the first 1130 system being programmed for data processing, and it is expected to provide valuable time and expense saving services to all departments.

Designed specifically for engineering companies and research laboratories, the IBM 1130 is suited for applications requiring mathematical calculations and statistical analysis as well as scheduling, engineering design, and job cost reporting.

Fred Roberts, formerly an engineer in the Research and Analysis section, was given the assignment of analyzing advantages of an in-house computer, determining the type of computer suited to Northrop needs and obtaining the computer.

According to Mr. Roberts, the computer will eliminate the time lag involved in communication between Hawthorne and Hunts-

ville in accounting matters and will diminish book work in the Finance department. It will minimize man-hour and travel expenses accumulated in trips to the Redstone Arsenal where all computing was previously performed.

The ability to tailor machine and user priority to contractual needs, rather than merging Northrop requirements with those of MSFC and various Huntsville contractors, is expected to be the most significant advantage.

Standard accounting formats prepared to date include employee payroll and insurance details, Savings Plan and bond purchase reports, labor distribution details, and cost accumulation under various contracts. Projected plans for the computer in the areas of contract and study reports include processing of data on manpower requirements for job assignments; progress made to date under various contracts to determine problem areas; and new study methods.

The computer will also serve as a valuable aid to management in project forecasting and in determining plans to use for contract bidding.

### ANALYTICAL COMMUNICATION

## Portrait of a Sentence as an Engineering Problem

Many sound technical concepts never see the light of day because the conceiver cannot make himself understood to others, says Professor Sidney W. Wilcox of Arizona State University.

Professor Wilcox is presently conducting a 12-week course in technical communications for 90 engineers, scientists, and proposal writers who work at Northrop Space Laboratories.

On the other hand, he added in a recent interview, there are people who have locked in their minds the knowledge to solve technical problems but cannot organize their knowledge to the point of developing a solution.

These are but two aspects of a situation which the professor is assaulting with some old fashioned tools of basic grammar, but with a new twist.

"My approach is to view communication as an analytical prob-

lem of the type which engineers face every day," Professor Wilcox said. "You have a problem; you design a package that will take care of it; you check it out; you make a trial run or a mockup; you finish it; you deliver it; and it does the job."

"When an engineer can approach communications by using well recognized principles of operation, he doesn't mind it at all. He likes it. This is how he becomes an effective writer or speaker."

While not disagreeing with the current popular theories of communications, he feels that many of them are not practical for proposal writing, technical reports and other types of communication found in industry.

"You cannot count syllables with an engineer, but you can help him squeeze out all that is not necessary. Still, he must be

precise which may lead to longer sentences. Our goal here is not brevity, as one modern school of thought would have it, but communication. When an engineer says precisely what he means there should be no problem about whether his sentences are too long or too short."

The men attending the course go one day a week at 4 p.m. in a conference room on the second floor of the NSL building. The two-hour classes held Monday through Friday, June 6 to August 26 are limited to 15 people.

During the 12 weeks the men analyze many facets of technical communication from simple sentences to technical papers. Most lectures are accompanied by writing assignments and critiques.

Perhaps one of the most unexpected assignments of the course is to read a novel. (The

last chapter of the textbook contains a five-year reading program covering a broad spectrum of fiction and nonfiction works. The text, Technical Communications by Professor Wilcox, was published by International Textbook Company.)

"Many executives of firms employing engineers and scientists have said to me they would prefer to hire people who are well read in imaginative literature," Professor Wilcox said.

"It is felt that this type of person would be the one most likely to continue working on a technical problem long after scientific or mathematical techniques are exhausted, simply because he is not afraid to use his imagination."

The course has two major effects, one on the individual and one on the company for which

he works, Professor Wilcox believes.

"The individual should come away with a calm assurance that he can cope with situations requiring communications. He may not know all the answers but he won't be afraid. He will be more inclined to express himself."

"The principal benefit to the company is that its people see more ways they can serve their employers and they are more likely to come forth with new ideas that are better organized, more precise, concise and meaningful."

Professor Wilcox served 16 years in industry before joining the ASU engineering faculty in 1955. Since then he has been an advisor and consultant for various professional groups including the California Teachers of English, the Arizona CPA's, STWP, and IEEE.



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

**For Sale**  
**Sofa**, contemp. decorator design, sauterne color, 101" width, 2 seat cushions, 4 back cushions, custom made at \$867 cost, \$450. Bel Air, 472-2571. A  
**Porsche coupe**, 1963, r/h, vinyl int., \$3000. Santa Monica, 395-7368. A  
**Chevrolet**, 1955, 2-dr. sedan, r/h, auto. trans., \$300. Inglewood, 758-9182. A  
**Ski Rack**, adjust. for convt. tops, holds 6 pairs, \$6. Torrance, 323-8089. A  
**Radio Equipment**, amateur-type, Clegg Thor 6 transceiver, complete w/power supply modulator, RF receiver sections & 10' interconnecting cable, \$250. Fullerton, 714-529-5961. A  
**Chevrolet**, 1957, new eng., paint, int., brakes, tires, \$850. Torrance, 378-2026. A  
**Sailboat**, 11' fiberglass Lark, alum. mast & boom, dacron sails, rigged w/nylon rope, avail. w/slip, \$395. Marina del Rey, 823-2655. A  
**Washer**, wringer-type, \$20. Hollydale, ME 3-2395. A  
**Home**, 4-bdrm., 1½ baths, btlins., service porch f/place, 5¼% G.I. financing, \$35,500. P.V., 378-0120. A  
**Chevrolet**, 1955, delux, r/h, auto. trans., \$150. Gardena, OS 5-2159. A  
**Home**, 3-bdrm., corner lot approx. 57 x 150, fireplace, btlin. island stove w/eating bar, 1¾ bath, fenced, heated pool, 4 yrs. old, near schools, \$38,700. Manhattan Bch., FR 2-0901. A  
**Chevrolet Impala**, 1959, p/b, p/s, w/w, new tires, \$500. Inglewood, 676-3132. A  
**Boat**, 15' Wizzard, all fiberglass, trailer, 35 h.p. Evinrude o/boad motor, \$500. Gardena, DA 4-7623. A  
**Sailboat**, 19', w/motor, 1964, 2 bunks, fiberglass, trailer, many extras, \$2500. Lawndale, 679-8490. A  
**Dining Room Set**, Danish walnut contemporary, boat-shaped table 57"x36", 4 uph. chairs, include 2 12" leaves & pads, cost \$400, \$100. Sepulveda, 894-8490. A  
**House**, east Long Bch. area, 4-bdrm., 3-bath, 2-story, h/wood flrs., elec. btlins., patio, landscaped, block walls, take over existing 5¾% loan, \$32,000. Cypress, 714-828-9142. A  
**Pickup**, Datsun, 6-ply w/w tires, hvy. duty bumper w/hitch, 4-spd. gear box, heater-defroster, other extras, \$1225. Lakewood, 425-1030. A  
**Coins**, 300 U.S. & foreign, \$100. Box 1501. Taunus, German Ford, 1961 4-dr. deluxe sedan, r/h, s/belts, 4-spd. trans., \$250. San Pedro, 831-9600. A  
**Mustang**, 1965, 2+2 fastback, auto. trans., \$2095. Torrance, 370-2048. A  
**Honda**, 1965, 250 cc, Scrambler, \$600. Inglewood, 676-8982. A  
**House**, 2-bdrm., full dining room, fireplace, dble. garage, \$20,950. Inglewood, OR 1-3860, FR 5-5097. A  
**Cadillac**, 1959, coupe DeVille, r/h, air cond., elec. windows, trunk, door locks, \$1000. Lawndale, 370-6472. A  
**House**, 3-bdrm. & den, 10 min. to Norair, near schools & fwy., panel & draped liv. rm., ample yard, \$21,900. Gardena, DA 5-2904. A  
**Honda**, 1965, 305 Super Hawk, scrambler, bars, 2 helmets, extras, \$550. L.A., 277-2549. A  
**Aquarium**, 26 & 10-gal., complete w/fish, pump, filters, heaters, reflectors & stand, \$65. L.A., WE 3-3051. A  
**Camper** for 1½-ton pickup, \$100. Hawthorne, 644-1205. A  
**Boat Loader**, cartop-type, \$25. Inglewood, OS 6-2162. A  
**House**, 5-bdrm., extra lge. living rm. & den, 2½ bath, patio, many trees, 2700 sq. ft., btlins, P.V. stone & brick fireplaces, \$39,950. La Habra, 691-5166. A  
**Camper**, \$250. Santa Ana, 714-547-2707. A  
**Thunderbird**, 1963, factory air-cond., all power equipped, orig. owner, 33,000 miles, \$1950. Thousand Oaks, 805-495-0507. A  
**Antique Jewelry**, family collection, \$3-\$15 ea. piece or whole group of 18 pieces, \$100. P.V. Pen., FR 8-1863. A  
**Bedroom Set**, child's, twin-size, chest, mirror, chair, book case, toy chest, \$95. Hawthorne, OS 5-7965. A  
**Sprite**, 1962, roll bar, 1965, 1100 cc eng., competition head, 1½" s.u. carb., Goodyear blue streaks, comp. exhaust, plus many extras, \$750. Port. Bend, 377-2921. A  
**Ford**, 1955, 2-dr. sedan, auto. trans., \$140. Hawthorne, 676-6423. A  
**Movie Camera**, Bell & Howell, 8mm, manual zoom, auto. threading projector, \$100. Hawthorne, 675-2813. A  
**Engine** for 1962 Sprite, complete, \$200. Box 1502. A  
**Range**, O'Keefe & Merritt, gas, w/griddle, grillvator, \$65. Hawthorne, 679-2983. A  
**House**, near Northrop, 2-bdrm. & paneled den w/fireplace, alum. siding, detached 2-car gar. 10% dn., \$23,500. Inglewood, 676-2958. A  
**House Trailer**, 38'x8' Stewart Coach, eastern blt., fully furn., new awning, \$995. Hermosa Bch., 374-3738. A  
**Ski Boat**, 16' Guasti, new velvet drive, Chev. 301 inboard, all fiberglass, \$2950. Torrance, 328-7997. A

**For Sale**  
**Ford**, 1957, Country sedan station wagon, p/s, p/b, w/w, auto. trans., recently o/hauled, factory luggage rack, r/h, \$195. Rolling Hills Ests., 377-3810. A  
**Shotgun**, Win. 12, trap, 32" full choke, vent rib, pad r/o stock, epoxy finish, \$225. Hawthorne, 676-4251. A  
**House**, 2-bdrm., 3 acres fenced for horses, 1½ bath, electronic oven, lge. serv. porch & pantry, det. gar., enc. brick patio, fruit trees, near Lancaster, \$19,950. Van Nuys, 805-943-4200. A  
**Guitar Amplifier**, 8" speaker, 33-watt output, dual jack input, 110 V ac, \$25. Torrance, 371-9925. A  
**Cadillac**, 1962, Eldorado convt., full power, factory air, leather int., \$2150. San Pedro, TE 3-9455. A  
**TV**, 21" General Elec. console, new picture tube, rebilt. tuner, antique white finish, \$45. Santa Monica, EX 4-8641. A  
**Triumph**, 1964, TR4, 2-dr. convt., low mileage, \$1900. Thousand Oaks, 805-495-9984. A  
**Chevrolet**, 1959, Bel Air, 2-dr., \$395. Inglewood, 674-1847. A  
**House**, Hollypark, 5 min. to Northrop, 3-bdrm. & den, sprinklers front & rear, gar., disp., dishwasher, range & oven, \$25,500. Gardena, DA 9-5657. A  
**House**, 3-bdrm., 7 yrs. old, 6' block wall, dble. gar., \$2000 dn. to existing 5¼% loan, consider second, \$19,000. Lakewood, 865-8009. A  
**Lots**, 2 adjacent, in Greenlawn section, Inglewood Park Cemetery, \$400 ea. or both \$700. Hawthorne, OS 6-8842. A  
**Darkroom Equipment**, complete outfit, enlarger, auto. timer, safe lites, mounted on sturdy compact table, all access., \$65. Hawthorne, 676-2803. A  
**Car Cooler**, Northaire, 12-volt, 2-spd., \$15. Inglewood, OR 1-1490. A  
**Volkswagen**, 1959, station wagon bus, \$495. L.A., 384-2918. A  
**Cabin Site**, Lake Arrowhead area, trees, road, water, electricity, ready for building, \$1500. L.A., 472-3374. A  
**House**, 4-bdrm., 2½ baths, large fenced-in backyard, immediate occupancy, \$56,900. P.V. Ests., 377-6100. A  
**Piano**, grand, chickering, \$750. Redondo Bch., FR 9-1804. A  
**Motorcycle**, 1964, BSA 350 cc, o/hauled, new wiring, take over \$28 mo. pymts., \$600. Lynwood, Ne 9-3608. A  
**Falcon**, 1965, auto. trans., metallic blue, \$1350. Burbank, 848-7790. A  
**Volkswagen**, 1963, r/h, many extras, \$1195. Torrance, DA 9-4356. A  
**Movie Camera**, 8mm Kodak, incl. projector & light meter, \$30. Newbury Pk., 805-498-3872. A  
**Dishwasher**, GE deluxe, portable, w/cherry-wood top, bronze, \$160. Manhattan Bch., 374-0940. A  
**Electronic Equipment**, 2" oscilloscope, sweep freq. oscillator, marker generator, Simpson mod. genescope, orig. cost \$550, \$175. Buena Pk., UN 3-2769. A  
**Tape Recorder**, Viking stereo 88, walnut case, \$195. Torrance, FA 8-8056. A  
**Bedroom Set**, dble. bed w/spring & mattress, 5-dwr. dresser, vanity w/bench, \$40. L.A., AX 2-3445. A  
**Rug**, 12x15 dk. brown, braided, \$25. Manhattan Bch., FR 6-9964. A  
**Trailer Hitch**, Super Tour-Aid, level-adjust., hvy. duty, cost \$110, \$50. Chino, 714-528-7604. A  
**Coffee Table**, w/matching end tables, white w/brass legs, \$65. Torrance, 371-5916. A  
**Autoette**, elec. car, used 1 month, \$600. Torrance, DA 5-7154. A  
**Dining Room Set**, 6-pc., birch, opens to 108" & pads, \$125. L.A., AX 2-1793. A  
**Volkswagen**, 1955, sedan, new brakes, engine o/hauled, \$450. Torrance, DA 3-8797. A  
**House**, 2-bdrm., gar., large fenced lot, \$18,500. Redondo Bch., 376-2117. A  
**Cribs**, w/mattress, \$10; w/out mattress, \$5. L.A., PL 7-3595. A  
**Dishwasher**, portable Kitchen Aid, never used, still crated, \$100. Manhattan Bch., 788-7519. A  
**Cornet**, \$65. Torrance, DA 9-9670. A  
**Volkswagen**, 1963, sunroof, \$995. Torrance, 375-2018. A  
**Stove**, 3-burner camp-type, Sears, \$10. Box 1503. A  
**Ford**, 1960, chrome wheels, hydraulic lift, \$900. Torrance, 324-8789. A  
**Chrysler**, 1956, 4-dr., \$75. Hawthorne, 671-0087. A  
**Bed**, child's, & play pen, \$20 or sell sep. Lynwood, 632-2642. A  
**Screen**, Aurora Super delux tripod-type, 50" x50", model S, \$20. San Pedro, FR 2-6585. A  
**Amateur Equipment**, Morrow MB560A transmitter plus 12 dc supply 80 thru 10 meters, \$40. Panorama City, 894-3244. A  
**Piano**, Fairbanks, upright, mahogany, new ivory, felt hammer pads & pedals, full keyboard, bench incl., \$125. Box 1504. A  
**Guitar**, Fender elec. Jaguar, w/case, custom white, \$450 value, \$325. Costa Mesa, 549-1760. A

**For Sale**  
**Wig**, 100% human European hair, black short-do, wig stand & case, cost \$175, \$55. Hawthorne, 644-2130. A  
**Refrigerator**, \$75. Buena Park, TA 7-1352. A  
**Racing Bike**, 10-spd., \$30. Rolling Hills Ests., FR 5-8536. A  
**House**, 3-bdrm., btlins, btlin TV/Hi-Fi area, raised fireplace, 500 sq. ft. playrm-workshop, 2½ car gar., fruit trees, walking dist. to shops, 20% dn., \$26,000. Alhambra, AT 4-5698. A  
**House**, 4-bdrm., family rm., 2½ baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A  
**Accordion**, 120-bass, Universal, 2 treble & bass reed sets, Mother-of-Pearl, w/locking velvet-lined case, \$150. Torrance, 371-9651. A  
**Air Conditioner**, powerful, \$125. Hollywood Hills, HO 3-6327. A  
**Golf Clubs**, left-handed, #2 thru #9 irons, 3 woods, \$35. Torrance, 324-9193. A  
**Rug**, 9x12, pale lavender nylon cut pile, \$40. P.V. Pen., 377-7670. A  
**Supercharger**, McCulloch, never used, \$50. Inglewood, PL 5-4497. A  
**Pup**, Collie, male, tri-color, 15 mos. old, reg., w/dog house, \$150. Lawndale, 679-0710. A  
**Vacuum Cleaner**, Hoover, upright deluxe, all attachments, \$17. Torrance, 770-1197. A  
**Range**, Philco, elec., \$15. Torrance, FR 8-0500. A  
**Home**, 3-bdrm., Torr. area of Rolling Hills, fireplace, serv. porch, block wall fence, patio, rm. for pool, \$25,500. Torrance, DA 6-2798. A  
**Transmission**, 4-spd., Ford, for 1960, '61 or '62 model, w/bellhousing, clutch, flywheel & throwout bearing, \$200. El Segundo, 322-3420. A  
**HO Train**, 1 old-fashioned-type, 1 freight, 1 pass., 6 elec. switches, 4x8 board w/buildings, \$45. Hawthorne, OS 6-9989. A  
**Car Cooler**, Bon-Aire, 12 volts, \$20. Lawndale, 370-3821. A  
**Record Player**, Steelman portable, w/record stand, \$25. Hawthorne, 676-3142. A  
**Speed Boat**, 14', merline hull w/Mercury Mark-55 motor, complete w/trailer, windshield, \$595. Lakewood, HA 5-0581. A  
**Ford**, 1965, Galaxie 500, r/h, p/s, fact. air, 17,000 miles, \$2295. Long Bch., GA 3-1363. A  
**Refrigerator**, Philco, good for apt. or cabin, \$35. Gardena, DA 4-2972. A  
**Mountain Cabin**, Idyllwild, 3-bdrm., den, sewing rm., 1¼ bath, elec. kitchen, fireplace, gas heat, 100x150 lot, \$17,200 loan, low dn., \$20,300. Anaheim, 714-535-6712. A  
**Volkswagen**, 1965, sedan, 12,000 miles, white int., w/s/w, \$1495. Inglewood, 673-1589. A  
**Front Fender**, left, for 1955 Chevrolet Bel Air, \$15. Long Bch., GA 7-4197. A  
**Birds**, finches & imported, 27 varieties, males, all for \$100. Hawthorne, OS 6-5250. A  
**House**, 3-bdrm., 1 bath, dble. gar., fenced yard, near schools, \$26,750. Redondo Bch., FR 5-2756. A  
**Sunbeam Alpine**, 1955 rdstr., rebilt. eng., trans., rearend, new tires, good top, \$290. Inglewood, 672-6188. A  
**Airplane**, 1948 Swift, 180 h.p. Lycoming eng., 171 hrs., 51 hrs. since new chrome cyls. & 4 ring pistons, full I.F.R. panel, rotating beacon, aux. tank & Mark XIII V.O.A. IV marker beacon, \$7100; w/out radio, \$6000. Palmdale, 805-947-4005. A  
**Sailboat**, 22' Star Class, 2 sets dacron sails, trailer, \$1850. Inglewood, 674-1951. A  
**Boat**, 14' all glass, 35 h.p. elec. start Evinrude, trailer, 2 6-gal. gas tanks, cover, \$525. OS 5-3254. A  
**Tool Chest**, 9-dwr. rollaway-type & mechanic tools, Craftsman, \$250. Redondo Bch., 372-4857. A  
**Cadillac**, 1960 Fleetwood, air cond., all extras, leather, \$1100. L.A., 645-5447. A  
**Ford**, 1946, station wagon w/Olds eng., new paint, \$100. Inglewood, OR 1-7803. A  
**Acreage**, 4 40-acre parcels, near Lake Isabella, mountain timber, \$220 to \$420 acre. Redondo Bch., FR 4-2945, 249-0185. A  
**Dog**, German shepherd, AKC, all black female, 5 yrs. old, \$150. Lawndale, 675-6283. A  
**Home**, Medallion, 4-bdrm., 1¾ bath, unusual kitchen, fireplace, dishwasher, screened in alum. patio, \$26,000. Torrance, 834-2175. A

**For Sale**  
**Ford**, 1965, Galaxie 500 convt., low mileage, \$2200. L.A., PL 6-2587. A  
**Wanted to Buy**  
**Boat**, alum., 12' or 14' & 9 to 15 h.p. motor, Redondo Bch., FR 2-5310. B  
**Camper Shell**, for ½-ton Chev. Fleetside pickup, 8' bed, full door across back, will pay \$100. Torrance, 325-8212. B  
**Writing Course**, must be complete. Hawthorne, OS 6-8331. B  
**Deep Freeze**, small. Rolling Hills, FR 7-3487. B  
**Secretary**, any finish, glass doors on top, good condition, pay cash or trade maple tables. Long Bch., 433-0861. B  
**Outboard Motor**, 7 to 10 horsepower. La Habra, OW 7-2445. B  
**For Trade**  
**Mercedes-Benz**, 1958, 220S, leather, Becker, belts, 1 owner, trade for 190 SL roadster. Folling Hills Ests., 375-7038. C  
**FREE (To Be Given Away)**  
**Engine & Transmission**, Packard 1954 straight 8 Ultramatic, can be rebilt. or used as strawberry planter. Inglewood, OS 6-3095. D  
**Box Trailer**, 2-wheel. Hawthorne, 676-3138. D  
**Rentals Offered**  
**House**, 3-bdrm., 1½ baths, btlins, fenced, forced air heat, lease w/option, or \$175 mo. Inglewood, 323-7244, 677-7660. E  
**Apt**, deluxe, 3-bdrm., 1¾ baths, fireplace, btlins, dishwasher, many extras, \$235 mo. Inglewood, 671-3798. E  
**Studio Apt**, 2 & 3-bdrm., 1½ bath, btlin stoves & ovens, pvt. patios, gar., \$125 & up. Inglewood, OR 1-8161, DA 5-4021. E  
**Cabin**, A-frame, at Big Bear Lake, Moonridge area, sleeps 6 adults or 4 adults w/children, 1 block from golf course, swimming pool & riding stables, \$30 w/end; \$80 wk. P.V. Ests., FR 7-3888. E  
**Apt**, 1-bdrm, unfurn., carport, btlins, water & trash paid, \$90. Hawthorne, OS 5-5898. E  
**Apt**, 1-bdrm., modern, furn., walking dist. to Northrop, no children, no pets, \$87.50. Hawthorne, OS 6-4734. E  
**Apt**, 1-bdrm., redecorated, near Northrop, water & trash paid, furn., \$90; unfurn., \$75. Lawndale, OS 5-9695. E  
**Studio Apt**, 2-bdrm., 2½ bath, w/all luxury features, subterranean parking, in Inglewood, \$180 on 12 mos. lease. L.A., 670-6084. E  
**Apt**, 1-bdrm., unfurn., redecorated, disp., tile kitchen & bath, baby OK, \$80. Hawthorne, OS 5-8335. E  
**Apt**, 2-bdrm., 2-bath, deluxe, near Northrop, small child OK, \$150. Hawthorne, OS 5-2772. E  
**Apt**, 2-bdrm., 2-bath, unfurn., new, dishwasher, pvt. balcony, sub. parking, play yard, \$155 mo. Inglewood, FR 5-0867. E  
**Apt**, 2-bdrm, unfurn., near Lynwood High School, \$99.50. Lynwood, NE 5-3250. E  
**Vacation Cottages**, Idyllwild, secluded, creek, patio, \$20-\$35 w/ends; \$50-\$65 wk. L.A., PL 4-5288. E  
**House**, 1-bdrm., unfurn., near Hawthorne High School, \$60 mo. Hawthorne, 323-9586. E  
**Vacation Cabins**, Lake Gregory & Crestline, make reservations thru Sept., \$25 w/ends, \$60 wk. Venice, EX 1-2040. E  
**Child Care Offered**  
**Child Care** in licensed home, fenced yd., hot lunches, reasonable. Lawndale, 679-5827. G  
**Personals**  
**Many thanks** for the cards, flowers & interest shown in my progress. I want you to know it is appreciated & I am looking forward to the time when I will be able to resume my association with you. PAUL H. CREWS. L  
**We gratefully acknowledge** the many kind expressions of sympathy in our time of sorrow. THE MARVIN EDWARDS FAMILY. L  
**To all my friends at Northrop**, thank you so much for your lovely flowers & cards & also the monetary contributions made to my family upon the death of my father. Your kindness & thoughtfulness were deeply appreciated. BETTY RUMPHORST & FAMILY. L  
**For Sale or Trade**  
**Lots**, 2, hunter's cabin, Big Bear, \$4000 or trade for trailer or boat. Manhattan Bch., FR 2-3878. M

Going my way?

**Rides Wanted**  
**7 a.m. — 3:45 p.m.**  
**Euclid & Katella**, Anaheim. Charles Day, Norair, ext. 1146, 772-9313. 2  
**7:30 a.m. — 4:12 p.m.**  
**Prairie & Imperial**, Inglewood. Bonnie Webb, Norair, ext. 2611, OR 7-0515. 3  
**Paramount & Del Amo**, Lakewood. Ruby Franks, Norair, ext. 1065, 422-3368. 3  
**8 a.m. — 4:42 p.m.**  
**Doty & 104th St.**, Inglewood. Virginia Koehn, Norair, ext. 1110, 671-5242. 5  
**Devonshire & Sepulveda**, Granada Hills. R. J. Rothstein, Norair, ext. 1188, 360-1377. 5  
**Erbes Rd. & Thousand Oaks Blvd.**, Thousand Oaks. Hugh M. Cameron, Norair, ext. 2845, 805-495-9984. 5  
**Topanga Cyn. & Ventura Blvd.**, Canoga Park. Richard Erickson, Norair, ext. 2314, 347-4288. 5  
**Victory Blvd. & San Diego Fwy.**, Van Nuys. Patti Schow, NSL, ext. 2766, 2757, 780-7444. 5  
**Topanga Canyon & Vanowen**, Canoga Park. Stanley J. Ehlinger, Nortronics Haw., ext. 75-461 & 462, DI 8-3289. 5  
**Melrose & Hoover**, Silver Lake & Hollywood Fwy., Los Angeles. J. F. Low, Norair, ext. 1676, 664-6564. 5  
**Platt Ave. & Victory Blvd.**, Woodland Hills. William J. Palmer, Norair, ext. 1074, 347-5940. 5  
**Rides Offered**  
**7 a.m. — 3:45 p.m.**  
**Euclid & Katella**, Anaheim. Charles Day, Norair, ext. 1146, 772-9313. 12  
**8 a.m. — 4:42 p.m.**  
**Erbes Rd. & Thousand Oaks Blvd.**, Thousand Oaks. Hugh M. Cameron, Norair, ext. 2845, 805-495-9984. 15  
**Topanga Cyn. & Ventura Blvd.**, Canoga Park. Richard Erickson, Norair, ext. 2314, 347-4288. 15  
**Victory Blvd. & San Diego Fwy.**, Van Nuys. Patti Schow, NSL, ext. 2766, 2757, 780-7444. 15  
**Topanga Canyon & Vanowen**, Canoga Park. Stanley J. Ehlinger, Nortronics Haw., ext. 75-461 & 462, DI 8-3289. 15  
**Melrose & Hoover**, Silver Lake & Hollywood Fwy., Los Angeles. J. F. Low, Norair, ext. 1676, 664-6564. 15  
**Platt Ave. & Victory Blvd.**, Woodland Hills. William J. Palmer, Norair, ext. 1074, 347-5940. 15

BOARDS

(Continued from page 2)

the two will benefit each other for greater combined growth. The Hallicrafters Company has divested itself of certain loss operations. The assets being acquired are expected to produce reasonable earnings," Mr. Jones said.

Northrop plans to form a new subsidiary which will acquire substantially all the assets and assume substantially all the liabilities of Hallicrafters.

The Northrop \$1 par value cumulative preferred stock to be issued will be convertible into Northrop common stock beginning three years after issuance. The conversion price will be 117-1/2 percent of the average closing price of Northrop common stock on the New York Stock Exchange for the 10 trading days immediately preceding the closing, but not less than \$34 and not more than \$45 per share. The preferred stock will be redeemable at \$35 a share any time after five years from issuance and will be entitled to receive \$35 per share in liquidation.

AD ASTRA PER ASPERA

(Continued from page 4)

for review.

"The acceptance of four papers at the IEEE convention helps to establish the Nortronics Applied Research department as one of the leading laboratories on radiation effects," George Messenger, chief of the Nuclear Effects group, said.

Titles and authors of the NARD papers were:

Effects of Oxygen and Dopant on Lifetime in Neutron-Irradiated Silicon; Dr. Orlie Curtis, chief of the Basic Mechanisms group.

Nuclear Radiation Effects; Mr. Messenger.

Effect of Injection Level on Carrier Lifetime in Neutron-Irradiated Germanium; Dr. Curtis and Carl Germano, associate scientist.

Detailed Lumped Model Analysis of Transistor Ionizing Radiation Effects; J. P. Raymond, scientist; and R. E. Johnson, associate scientist.

In addition, Dr. Curtis and Mr. Raymond were on the conference Papers Committee; Dr. Curtis was on the roundtable on Fundamental Damage Mechanisms; and Mr. Messenger was chairman of the Awards Committee and chairman of the first session, which was devoted to Displacement Effects in Silicon.



## Anaheim Artists Display Original Paintings at PV

Paintings by a group of eight Northrop Nortronics artists at Anaheim are attracting a great deal of attention in their new display environment at Palos Verdes.

The eight artists are all members of the NRC-sponsored Art Club at Anaheim who paint as a hobby. For the past two years better paintings originating in the club have been displayed in the corridors of Nortronics Anaheim buildings.

Top Nortronics officials noticed the paintings and asked that they be shown at Nortronics Palos Verdes. Twenty-three paintings were selected for this purpose.

The eight artists responsible for the 23 paintings are Ed Mosher, Bob Peck, Jack Flannagan, Ted Witsel, Bob Mack, Peggy Lambert, Victoria Bracher and Chuck Filder.

Following their successful debut at Palos Verdes, the Art Club has received some interest in shipping paintings back east to be displayed at Nortronics facilities there, Mr. Mosher, NRC Art Club commissioner, reports.

## PICNIC

(Continued from page 1)

and choral performances, bingo, dancing, attendance award drawings and a lot of other factors.

This is the work now in progress as Northrop Recreation Clubs plan the all-Northrop family picnic, dubbed "Roundup Time," for August 28 at the Los Angeles County Fairgrounds, Pomona.

NRC presidents at Norair (Bill Wareing) and Nortronics (Joe Kalina) and their respective special events chairmen, Dave Carney and Bob Marsh, are leading the pre-picnic planning.

Bob Benedict, Anaheim NRC president is cooperating in the planning.

They are each utilizing the talents of NRC Councils and a lot of volunteers who are working in advance to make this big annual event a success.

The helicopters are a special feature. They will provide family rides over the area for the lucky ticket holders whose names are drawn as attendance awards. Even luckier will be the couple winning the grand prize — three days and two nights in a Las Vegas hotel, plus roundtrip jet air transportation.

A majority of the events planned are free, with nominal charges for food items like hot dogs and "sudsy" beverages. Cola, popcorn and ice cream are "on the house" as are all the midway rides, bingo, featured entertainment and the rest.

## DRILL

(Continued from page 1)

drill) to remove the rock chips from the hole.

The design study is labeled Phase "C" by NASA. Phase "D", to be awarded following evaluation of Phase "C" findings, would include manufacture. One other firm, the Martin Company, also has a Phase "C" contract and is competing with Northrop.

The tool is called the Apollo Lunar Surface Drill. A much larger lunar drill, capable of cutting as much as 100 feet into the subsurface of the moon, is being designed by NSL at Huntsville, Alabama under a contract with another NASA center.



**VOICE OF NORVIPS**—Mrs. Joan Ririe prepares for another recording session at Nortronics Palos Verdes with Bill Stroub, project engineer on the U.S. Army NORVIPS program. Mrs. Ririe records the taped warnings for the NORVIPS Voice Warning System. She has acted and sung professionally.

## NORVIPS: She 'Talks' to Pilots, Submariners and Artillerymen

(Continued from page 1)

been singing since she was 3 years old.

Today, she and her husband, a professional drummer, have two children — a 3-year-old daughter and a 1-year-old son.

When she isn't involved in the usual duties of mother and housewife, and isn't recording for NORVIPS, she's teaching in night school.

Mrs. Ririe teaches English, speech and citizenship in adult school at Washington High School in Los Angeles.

Before her marriage, four years ago, she lived in Sydney, Australia, for six years, where she owned a wrought iron furniture store.

The engineer who records her voice for NORVIPS, Northrop's Bill Stroub, became her accom-

panist one night in an impromptu "jam session."

"We were recording NORVIPS messages one night," Mrs. Ririe said, "and Bill had a guitar there. So we took a break when we finished the NORVIPS tapes and recorded a tape of music."

"Bill played the guitar, and I sang. He really plays well."

Mrs. Ririe doesn't get much of a chance to study her "script" for NORVIPS.

"I just go there," she said, "and I'm given a sheet of paper with the messages on it. I read them over a few times and record them. One day I had to do about 90 of them. I was really exhausted when I finished."

She admits her NORVIPS recording work is "just a little bit different from most jobs."

## Winter Bowling Leagues Organizing in Southland

The big season of the year, winter bowling, is at hand for Northrop Norair, Nortronics and NSL personnel and their friends throughout the Southland.

Entry blanks are now available through Personnel Activities with leagues slated to begin rolling the first and second week of September.

Chet Guzinski, NRC commissioner at Anaheim, has planned two leagues, a mixed loop on Tuesday and a men's scratch league on Thursday, both at Carter Bowl, Fullerton.

Bill Myerson and Vi Jennings of Norair and Dorothy Baldwin of Nortronics Hawthorne-Palos Verdes have scheduled 10 leagues.

On Mondays a mixed five handicap loop will roll at Tropicana. Tuesdays will feature a men's scratch classic and a mixed five scratch loop at Missile and Del Mar, respectively. On Wednesdays a men's five scratch at Del Mar and a mixed five handicap loop at Missile are planned.

Thursday offers a wide choice of leagues, a mixed five at Missile; a mixed four (Peterson Point) at Gardena; and a beginners low average mixed four at Del Mar.

Night shifters may roll at 1:30 a.m. each Thursday in a Del Mar mixed trio handicapped league or a men's scratch trio planned for the Del Mar alleys at 1 a.m.

While many keggers are looking forward to still another season, others are putting up trophies awarded at the conclusion of the 1965-66 winter leagues.

These champions have been named:

### Football Tickets

A limited number of tickets to the August 20 "double-header" football game marking the debut of professional football at the new Anaheim Stadium are available through Personnel Activities.

The tickets, all near the 50-yard line, sell for \$6 each. The game will match the AFL's Boston Patriots against the Oakland Raiders at 6 p.m. and the San Diego Chargers against the Kansas City Chiefs at 9 p.m.

Missile Bowl (Wednesday mixed five): team, Ray Martin, Belle Donnici, Bernice Martin, Bob Oakden and Dick Donnici; series, Harvey Hemmingsen and Wilma Myerson; game, John Baldwin and Loraine Harvey.

Missile Bowl (Thursday mixed fun): team, Chris Kringel, Lee Carlson, Carol Lemberger, Cliff Getz and Len Kaufman; series, Eddie Ross and Jill Skeen; game, Max Wenzel and Mildred Dyar.

Missile Bowl (Tuesday 865 classic): team, Ray Jackson, Fred Woods, Dick Coffey, Doc Lindsey and Al Taie.

Del Mar (Thursday 460 scratch): team, Thola Fromer, Walt Le Beau, and Mac McLarney; series, Art Marta and Darlene Hardin; game, Tom Abranofsky and Thola Fromer.

Southwest-Nortronics (Thursday mixed): team, Ron Beye, Don Lizotte, Kyle Douglas, Marge Ryan and Marlene Hodson; series, Hal McVey and Marge Ryan; game, Bev Barnes and Kyle Douglas.

Tropicana (Monday mixed five): team, Lefty Silva, Jerry Alexander, Neil Bennett, Opal Briggs and Inez Gilleland; series, Ben Mizikowski and Bert Muensterman; game, Carman Schrank and Herb Riley.

Del Mar (Tuesday 825 scratch): team, G. Bardizbanian, Bob Karns, Bill Niemann, John Piar and Chet Bernat; series, Harvey Hemmingsen; game, Earl Guisinger.

Del Mar (Thursday 500 scratch): team, Lloyd Leonard, Bert Osterberg and D. Gibbs; series, Gene Lurk; game, Carl Scott.

Gardena (665 classified scratch): team, Everett Burgmaier, Bud Kobi, Lois Boyer and Paula Gardner; series, Calvin Kahl, Bill Myerson and Eve Taylor; game, Calvin Kahl, Lew Ely and Irene Bledso.

## CADETS

(Continued from page 1)

L. Ernak and James P. Hogarty. The newly graduated cadets are Lieutenants John R. Wormington and William B. Rankin.

Nine cadets took part in last year's summer session at Northrop.

For their four weeks at Northrop, the Air Force men have been paired off with research scientists studying the various disciplines affecting the environment of nuclear weapons effects.

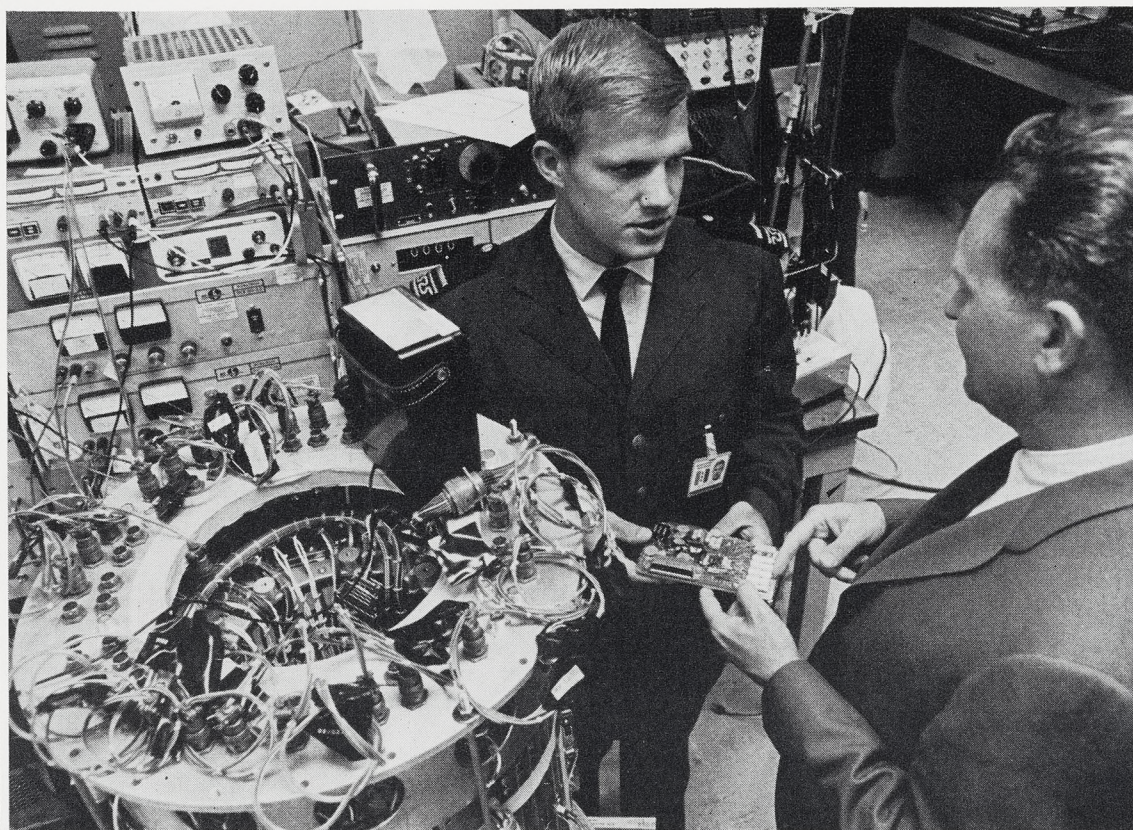
"We had never received support from industry before the Northrop program last year," Captain Johnston told Dr. Hicks.

"Our cadets have learned a great deal. One of our biggest problems has been showing these students the real value of the subject matter we teach."

"Here they are able to see how their mathematics and physics are put to use."

"It's gratifying to us just to have these young people here," Dr. Hicks said. "It is encouraging to see people of this age doing so much. The benefit to Northrop in this program is our ability to expose future Air Force officers to the actualities of industrial research and to give them a better appreciation of our problems."

Costs incurred in the summer research program in industry are not charged to the government.



**AIR FORCE VISIT**—Air Force Academy First Classman John P. Cerak discusses with Dr. Donald A. Hicks an electronic module which has been "hardened" to resist the effects of

nuclear radiation. The module is part of a special tape recorder device (at left) under development at the Nortronics Applied Research department (NARD).



# NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California

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August 17, 1966

## Picnic Offers Something For Everyone

Tickets to the big all-Northrop family picnic to be held August 28 will be distributed Friday (August 19) with regular Northrop Corporation paychecks.

Military personnel or employees of other firms who are assigned to work at Northrop facilities may obtain their picnic tickets by calling at any Personnel Activities office.

Each ticket is good for admission for a full Northrop family. It will unlock a full day of activities with events tailored to the taste of all ages.

Costs will be kept to a minimum with only food items and "sudsy" type beverages sold. Cola,

(See photo on page 6)

ice cream, popcorn, etc. will be distributed without charge. And all rides and attractions, including prize drawings, will be free.

This event, billed as "Roundup Time," will be staged at the Los Angeles County Fairgrounds at Pomona.

The gates open at 10 a.m. and close at 7 p.m.

Throughout the day family members will find some activity in progress to their liking. At 10 a.m. an inter-divisional all-star softball game will be played; at 11 a.m. a model airplane exhibition presented; at 11:30 children's games and contests, complete with prizes, will be staged; at 2 p.m. the bingo attraction opens; at 2:30 the popular NRC Symphonaires will entertain; at 3 p.m. there will be square dancing; at 4 p.m. the "Scamps" will play for teenage dancing; and at 6 p.m. music for dancing by all adults will be presented.

Kiddieland, with 15 rides, all free, will be operating full blast from 1 to 7 p.m. At 1, 2, 3 and 4 p.m. drawings will be held for free family helicopter rides. And

(See PICNIC, page 6)

## Boeing Awards Contracts For Supersonic Transport

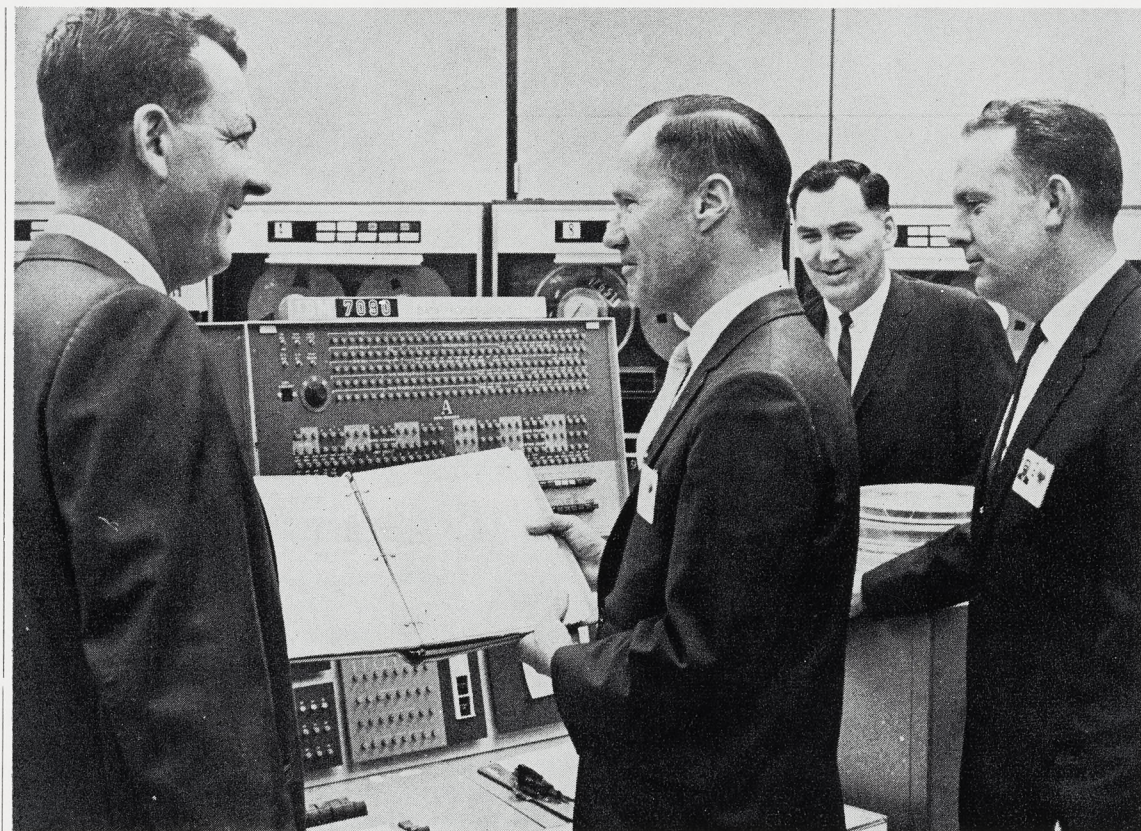
Northrop Norair and five other aerospace firms have been named by The Boeing Company to do major subcontract work on the SST prototypes Boeing is competing to build.

Norair will manufacture body structures for the jet airliner prototypes. Negotiations are under way, and the exact dollar value of Norair's part of the program has not yet been determined.

Under Boeing's "total-program" plan, Norair and the other subcontractors working on the SST will be assured the opportunity of a continuing part in production on the supersonic airplane.

Subcontract work by the six companies will total more than \$1.5 billion, based on the Federal Aviation Agency proposal of an initial production of 200 Boeing supersonic transports.

Manufacturing will entail mill-



IT'S DONE WITH COMPUTERS—Nortronics has implemented Northrop's first fully automated material inventory control system. It was used for past 11 months on production programs at Anaheim, is now being expanded for C-5 pro-

duction at Hawthorne. Quartet above played key roles in developing this system. They are, from left, E. J. Johnson, Dick Shave, Hal Worrell and Bob Clay. System utilizes computers like IBM 7090 of Northrop Data Processing.

### NORTHROP'S FIRST

## Automated Material System Expanded

Northrop Corporation's first fully automated material inventory control system, conceived and implemented by Nortronics, is being expanded to cover new production activities at both the Anaheim and Hawthorne facilities.

Nortronics installed this highly sophisticated system, among the first of its type known, 11 months ago for production activities in progress at Nortronics Anaheim.

The current expansion will afford similar automated material inventory control for C-5 production at Hawthorne under the direction of Bob Sadil, general supervisor, and Jim Baldwin, supervisor, of Material Control.

Nortronics calls this unusual system a Materials Integrated Information System or simply MIIS.

It is, in the most basic of terms, automated material control ranging from the establishment of initial requirements through the issuance of materials to manufacturing. It covers all direct materials—from nuts and bolts to complex subsystems supplied by vendors.

Installation of this system could not have been more timely in that Nortronics is currently at work on the most diversified line of products in its history.

"In 11 months of operation MIIS has proven highly effective in material inventory control," said D. A. McLinnis, director of Materiel. "As a management tool it is invaluable in providing fast, intelligent inventory information, effective inventory and cost control, and readily available status information."

Nortronics began to lay the groundwork for MIIS some two years ago with the gradual switch of three major material control functions—the recording and control of material requirements for inventory accounts, inventory and cost control, and minimum/maximum stocking—to separate, but compatible, data processing systems.

### Open House Now Set For Early October

An "Open House" tentatively scheduled for early September has been re-scheduled for October 9 at Northrop Nortronics' Anaheim facility.

Open to all Nortronics employees, their families and guests, the affair will feature a plant tour, product display and other activities between 1 and 4 p.m.

These systems, plus another for automated purchase order and receiving report efforts, became the backbone of MIIS.

When blended with the extensive capabilities of Northrop Data Processing's high-speed computer center at Hawthorne, the MIIS subsystems represent a total system that has all but eliminated the human error factor that has traditionally plagued manual material control concepts for years.

Prior to the implementation of MIIS, Nortronics provided material control over approximately \$5 million in direct materials each year through the utilization of about 50,000 records, each posted and processed manually.

With its ability to consolidate many elements of information, MIIS requires only about 5800 records for a similar volume.

A key to MIIS' effectiveness is the assignment, by Configuration Management, of six-digit numbers to each and every part

(See MATERIAL, page 6)

## TEAMS Gets The 'Works' Weatherwise

Extreme environmental conditions—heat and cold, shocks and shakes, humidity and water spray, inclined operation and noise—are being employed in an intensive test program in progress on Northrop Nortronics' initial TEAMS system.

The program is a full-scale Reliability and Qualification test effort centered at the Northrop Norair Environmental Laboratories.

TEAMS (Test Evaluation and Monitoring System) has been ordered by the United States Navy to monitor crucial ship-board electronics systems for a new class of destroyer escort.

Current tests are being performed on the TEAMS unit as part of an extensive verification program. Work is already under way at Nortronics Anaheim on initial production models.

Two major phases, Reliability and Qualification, are involved in the present program, each expected to last about 10 weeks.

"Our over-all program is set up to meet or exceed the most exacting Navy specifications for the equipment," said W. P. Van Ordstrand, TEAMS program manager. "Test program extremes are far beyond those ever expected to be encountered by TEAMS units in operational use."

Reliability testing will require a minimum of 600 hours. Toward this end tests in progress are now being conducted around-the-clock, five days per week.

Mounted on a vibration fixture within a special chamber in which temperatures and humidity are rigidly controlled, TEAMS is being put through its paces. In a repeated test cycle the input voltage is being altered from 90 percent of nominal to nominal and then 110 percent of nominal with de-energizing periods. Every 24 hours a two-hour vibration cycle is completed. And temperatures are

(See TEAMS, page 6)

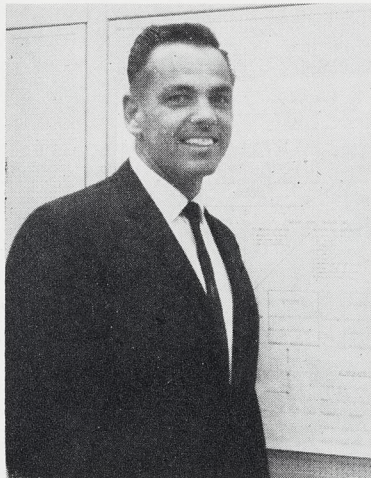
### Management Club To Hear Educator

Dr. Kent M. Floyd will be principal speaker tonight when members of the Northrop Nortronics Management Club meet at the Long Beach Elks Club.

Dr. Floyd, assistant professor of Public Administration at USC, also is a lecturer, author and consultant. He will discuss "Executive Leadership and Effective Performance—Behavioral Science Perspective."

Another feature of the meeting will be the showing of a film on Nortronics' ALOTS system tracking a Titan launch.

In other activities, the club has set November 18 as the date for its annual dinner-dance. The event will be in the Biltmore Bowl in Los Angeles' Biltmore Hotel. Maty Malneck's orchestra will play.



Bob Sadil is leading implementation efforts for an automated material inventory control system at Nortronics Hawthorne for use on C-5 navigational system production.



## JACK NORTHROP'S DESK

## Out of the Archives, a Memento

Interesting stories often emerge from unusual places—such as the forgotten archives of Northrop Norair's Plant 3, which was demolished recently to make way for new production facilities.

During evacuation of the area, a sharp-eyed observer discovered a special item — a desk. In short order a group of veteran Northrop employees established the fact it was, indeed, a special item.

The desk was once used by John K. Northrop, founder of Northrop Corporation and its president until his retirement in 1952.

Working quietly, the veterans rescued the desk and refurbished it. Thomas V. Jones, Northrop president and chairman, heartily endorsed the activity and helped arrange for it to be presented to Mr. Northrop and his wife, Margaret. Accompanying the desk was a book of photographs of historic Northrop-built aircraft and veteran Northrop employees who participated in their development.

Following the presentation Mr. and Mrs. Northrop admitted to being "floored" by all the elements of "Christmas in July."

They wrote to Mr. Jones:

"On partial recovery it became apparent that the event could only have happened with the help of a great many warm-hearted friends. And because the identification and individual thanks to all those involved is impossible, much gratitude and appreciation will have to be compressed in this brief letter to you, with the hope that it will reach all those who participated, directly or indirectly, in this very happy occasion.

"We can only say in addition that the knowledge of this enduring friendship after fifteen years 'out of sight, out of mind,' is one of the happiest events of our lives."



"AN ENDURING FRIENDSHIP"—Mr. and Mrs. John K. Northrop are flanked by Ben Trump (right) and Tom White of Norair as they receive keys to refurbished desk Mr. Northrop once used at Plant 3. Mr. and Mrs. Northrop acknowledged "enduring friendship" they feel for all Northrop people and called the unexpected receipt of the desk "one of the happiest events of our lives."

## BOAC PURCHASE BRINGS TOTAL ORDERS FOR BOEING 747's to 41

British Overseas Airways Corporation (BOAC) has ordered six 747 passenger jets from The Boeing Company, bringing total orders for the 747 to 41.

Northrop Corporation is the largest subcontractor in the 747 program, building a 150-foot section of the fuselage, and fiberglass wing fairings which join the wing area to the fuselage.

The BOAC order was authorized this month by the British government. Delivery is scheduled for 1969 and 1970.

BOAC estimated that the six 400-seat passenger planes, plus spare parts, will cost about \$154 million.

Pan American World Airways has the largest order for 747 jets, with 25 scheduled for delivery from September 1969 to May 1970.

Japan Air Lines (JAL) and Lufthansa, a German company, each have ordered three. JAL is scheduled to receive its planes in April through June 1970. No date has been set for the Lufthansa delivery.

Norair will ship the fuselage structures to Renton, Washington, for final assembly at Boeing. The wing fairings will be shipped from Ventura to Renton.

Boeing expects to build 400 of the huge 747 jetliners by 1975.

## Field Trip

The NRC Gem and Mineral Club will stage an August 20-21 field trip to Jalama Beach County Park. Juanita Nelson and Rex Russell of Norair and Richard Hicks of Nortronics will accept reservation requests.

## TWO SUBSIDIARIES IN ARCHITECTURAL FIELD MERGED

A substantially increased product line has resulted from the merger of Northrop Architectural Systems, Inc. (NAS) and Pacific Curtain Wall, Inc. (Pac/Wall), two of Northrop's wholly-owned subsidiaries.

The merger provides the building industry with single-source supplier of a wide range of quality custom and standard products, according to the company's new chief executive officer, Douglas B. McFarland.

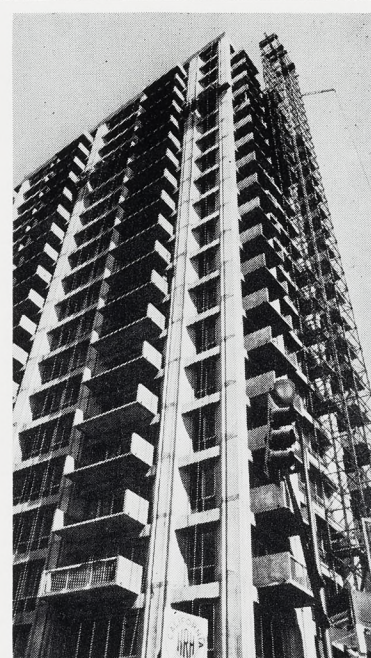
The realignment is the latest step in a long-range corporate plan blueprinted when Northrop formed NAS in 1961 and acquired Pacific Curtain Wall in 1962.

A consolidated corporate office is being set up at NAS's newly occupied production facility in the City of Industry. Pacific Curtain Wall's Long Beach production facility will continue to operate under its own supervisory staff.

The Arcadia line of quality aluminum building products will continue to be manufactured at the Industry plant, and the Long Beach plant will continue to manufacture curtain and window wall and allied products.

"The amalgamation of the special capabilities of the staffs of the merged companies enables both firms to provide a more personalized and complete line of standard and custom products for the building industry," Mr. McFarland, who is the former president of Pac/Wall, said.

Other key executive appointments announced include: Bill Osborn, former operations manager for NAS, to be vice president — Operations; Don White, former NAS vice president — Sales and Marketing, to be acting general manager; Keith Ingebritson, former treasurer of Pac/Wall, to be treasurer of the combined companies.



Pacific Curtain Wall balcony railing (lower left) and Northrop Architectural Systems sliding glass doors on balcony approaches are being installed at Century Park Apartment buildings in Century City, a few blocks from Northrop's Corporate offices in Beverly Hills. The two subsidiaries of Northrop recently merged.

## Bradford Made Life Member of SCIEA

The Southern California Industrial Editors Association has conferred a lifetime membership upon Charles Bradford, editor of the NORTHROP NEWS for 22 years.

Mr. Bradford becomes one "of only a handful who have been held in such high esteem," according to Robert W. Graf, SCIEA president.

In proclaiming Mr. Bradford a Life Member, the SCIEA executive council said: "Conferment of this class of membership shall be regarded as the highest honor which SCIEA can bestow . . . and shall be reserved for persons who have demonstrated exemplary ability in the profession of industrial editing and performed outstanding services to SCIEA."

Semi-monthly investment of \$18.75 in Series E U. S. Savings Bonds will produce an accumulated value of \$3595 in just seven years' time.

## DAVE KENNEY'S VINTAGE ROADSTER

## His Heart Is on His Sleeve for Inside-Out Morgan

It isn't every day you see a Morgan three-wheeled roadster — since there are less than a dozen known to exist in the United States.

But David Kenney of Norair Systems Reliability saw one in London, where the sports cars were built from 1913 to 1939, and decided there and then that he wanted one.

"It was during the war," Mr. Kenney said. "This little car, with the engine out in the open, came speeding past me at about 100 miles an hour. When it went by, I saw it only had one wheel in back. None of my friends would believe me. It was like trying to tell them I had just seen a flying saucer."

After the war, Mr. Kenney returned to the United States and joined the Morgan Three-Wheeler Club, an international group with headquarters in London.

He made two trips to England in the last three years, trying to find a vintage three-wheeled Morgan someone would part with.

"Finding a car wasn't so difficult," Mr. Kenney said, "but finding someone who would sell one to me, knowing that I planned to take it out of England, was a different problem."

Finally, still without a Morgan, he returned to the United States and ad-

vertised in a British sports car magazine.

"I got an answer right away, from a man with a 1936 model," Mr. Kenney said, "but it took a while to convince the owner he really wanted to sell it. At first, he said he would. That was in January.

"Later, he wrote me and said he had changed his mind, and wasn't going to sell it. Finally, he agreed to sell. I imagine the antique car clubs over there have blackballed him."

The dark green roadster has a two-cylinder Matchless motorcycle engine, modified to make it water-cooled. The engine is mounted externally in front of the car. It produces 45 horsepower, enabling the 850-pound Morgan to do 100 miles an hour, while averaging about 50 miles per gallon mileage at normal speeds.

It has no doors (you climb in), no shock absorbers and no accelerator pedal.

"There's a hand throttle on the steering wheel," Mr. Kenney said. "So when you're turning a corner, with one hand on the gearshift, you have to use the other hand to turn the wheel and let up on the throttle, and then change gears and accelerate again."

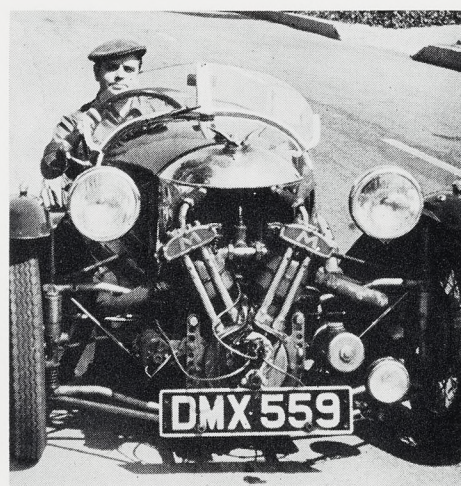
Mr. Kenney had never driven a Morgan until his purchase arrived early this

summer. He does remember — rather vividly — his first ride in one.

"I was in London," he said, "and a man gave me a ride in a 1925 three-wheeler. I asked if he'd sell it, and he wouldn't, but he did take me for a ride.

"He went shooting down a street at about 60 miles an hour, then turned all of a sudden into a little alley about six feet wide.

"See? They don't turn over," he told



David Kenney of Norair Systems Reliability drives through Palos Verdes in three-wheeled Morgan.

me. "That's just a myth that was spread because they have three wheels."

Mr. Kenney bought his 1936 roadster sight unseen, except for pictures the previous owner sent him.

"He (the owner) crated the Morgan up and sent it over," Mr. Kenney said.

"It's in pretty good condition, except for some valve clatter at high speeds and an oil leak in the transmission.

"In the last letter the owner wrote me, he told me to be sure and take it to someone who knows how to work on it, when I need repair.

"Where am I going to find someone who knows anything about them?"

Mr. Kenney isn't worried about service, however.

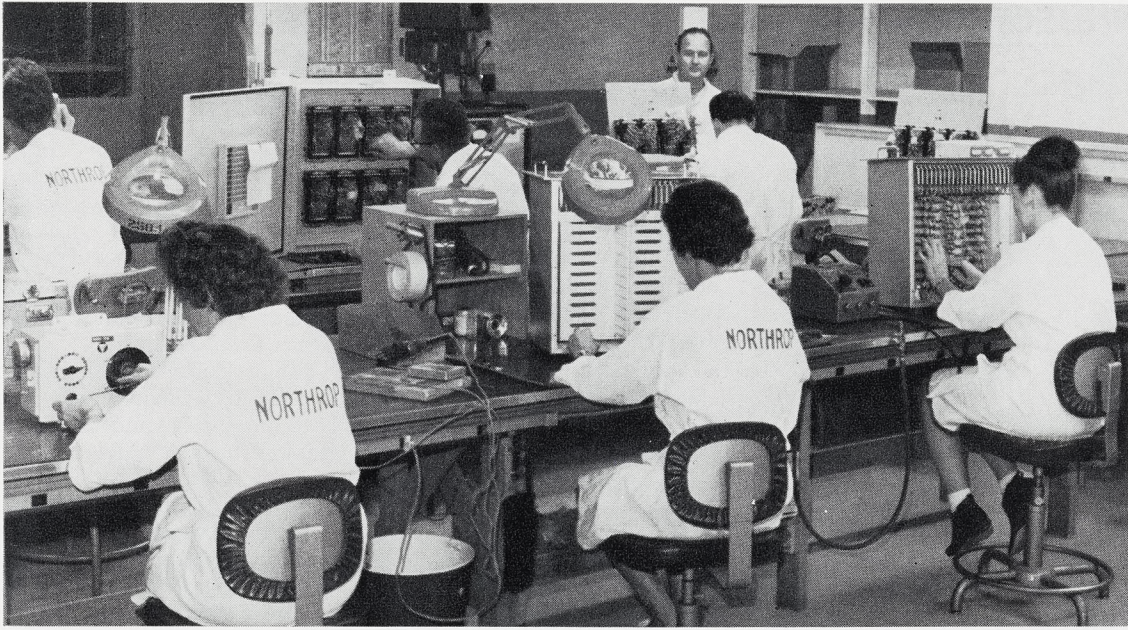
"There's a place in London that has all the parts," he said. "But I'll have to do the work on it."

Mr. Kenney remembers when he first pulled the Morgan into his driveway and started the engine, certain that nobody else in the neighborhood had ever seen one.

"My next door neighbor came running out of his house, with his wife, turned to me and said:

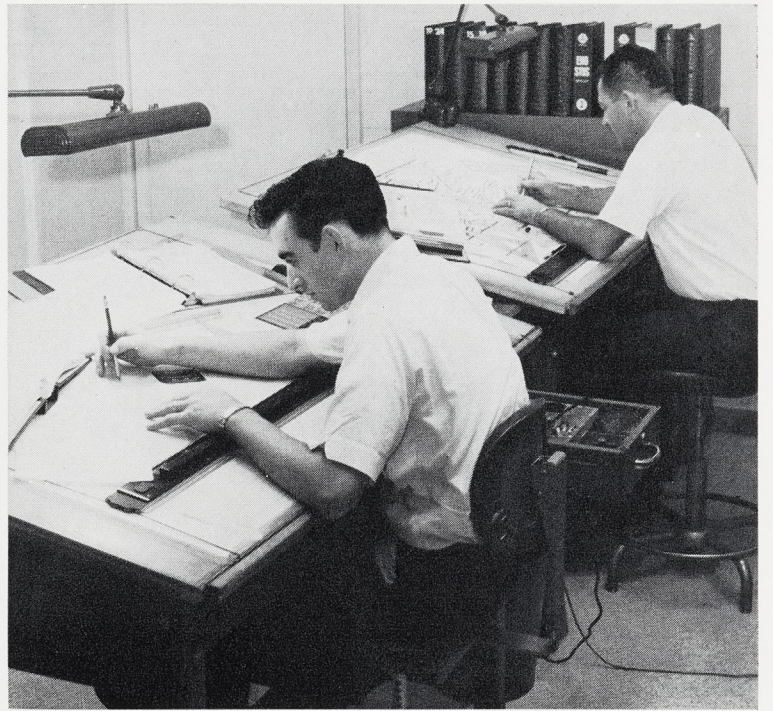
"Look at that. I just told my wife that only one thing in the world could sound like that — a Morgan three-wheeler."





Northrop/Cape Operations shop personnel assemble patching and distribution panels for installation on Complex 37B at Kennedy Space Center. Facing the camera is Quality

Control Inspector Norman Davis. Preceding fabrication however, is completion of fabrication drawings (right photo) by Gordon Snider, assisted by John Franklin.



## SATURN COMPLEXES

# Communications for a Moon Port

Among the high-rise buildings and bright lights which have replaced the mosquitoes and palmettoes around Cocoa, Florida, 54 Northrop support operations specialists are supplying and installing the complex communications systems used for the launch of the Saturn booster rocket at Kennedy Space Center.

Being installed for NASA are complete hardware communications systems for use inside the launch control centers and automatic ground control stations, and for all other locations within the launch complexes numbered 34 and 37.

Complexes 34 and 37 will be the country's first moon ports. The Saturn booster, which is presently undergoing test flights at Cape Kennedy, is the forerunner of the vehicle which will send Apollo astronauts on their way to the moon in 1970.

The two launch complexes, located on Merritt Island, were specially constructed for the Apollo/Saturn program.

Communications within the launch complexes are especially critical because buildings are often hundreds of feet apart for safety purposes, according to R. F. (Dick) Jonas, who directs the Northrop/Cape Operations activities.

Northrop engineers and technicians have designed and fabricated communications equipment which have demonstrated an operational reliability of approximately 100 percent over several years of operation.

A single-story, concrete block building on U.S. Highway 1, adjacent to the Merritt Island Launch Area, houses Northrop's engineering and administrative offices, as well as an electronics laboratory and manufacturing facility.

At the Apollo/Saturn complexes, installation crews use a trailer as general headquarters.

The Technical Operations Office, constantly manned by Bob McCorkle and John Nelson, coordinates the multifunction requirements which assure NASA that regardless of last minute changes, inevitable in launch situations, the required communications will be ready for test and launch.

The manufacturing area, under Red Grimley, includes an assembly area and a large cable mold area. In the assembly area, communication

panels are assembled and reworked. In addition, many units of the system are manufactured including patch distributors, headset extension boxes, and line amplifiers. One thousand printed circuit cards for use in the communication system are being reworked and tested.

The air-conditioned manufacturing facility has a capacity of molding as many as forty large cable ends, or one hundred small cable ends, per day and has twelve stations operating for cable fabrication and soldering. A cable preparation area is used for preparation of the cables for molding.

When the cable molding is complete, a special cable tester is used to check for high resistance shorts, continuity, and integrity. A large assembly area is used for wiring, rewiring, and soldering of stations, distributors, and the many other items of communication systems being manufactured.

Still another area is devoted to a machine shop with capabilities for cutting, drilling, and much of the work on the boxes required for the system. A paint room with a complete air ventilation and blower system and lamp drying area is used for painting units.

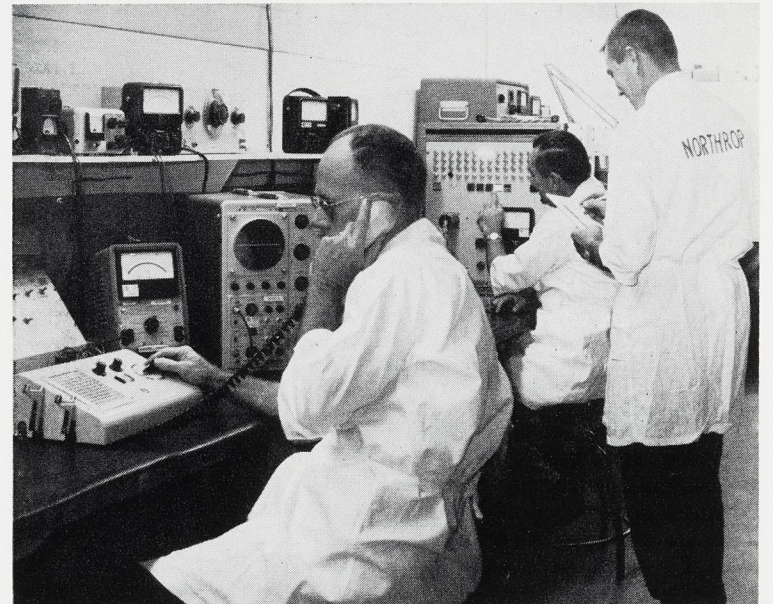
A large temperature and humidity-controlled shipping and storage area can accommodate 2200 cubic feet of equipment on adjustable storage racks. On completion of assembly, units of the system are checked in the test laboratory.

Engineering capability ranges from system analysis and preliminary design to detail design, liaison engineering, manufacturing and installation design, and the writing and publication of operation and maintenance instructions.

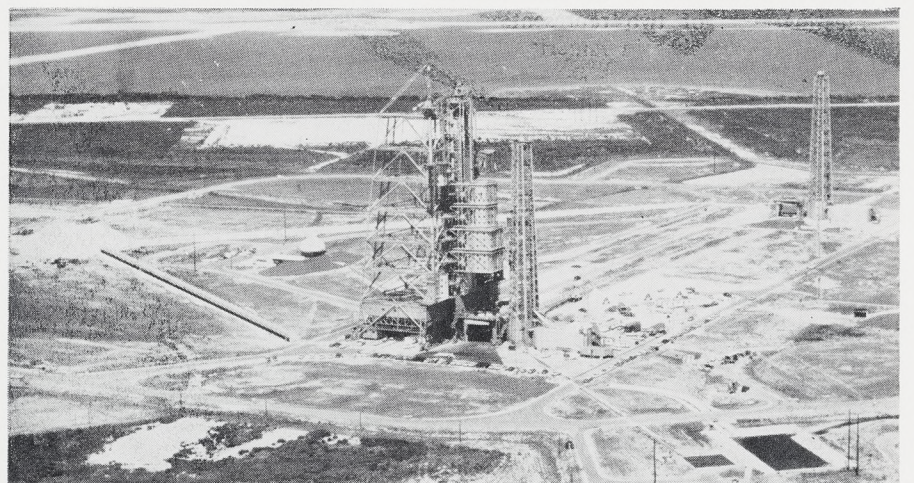
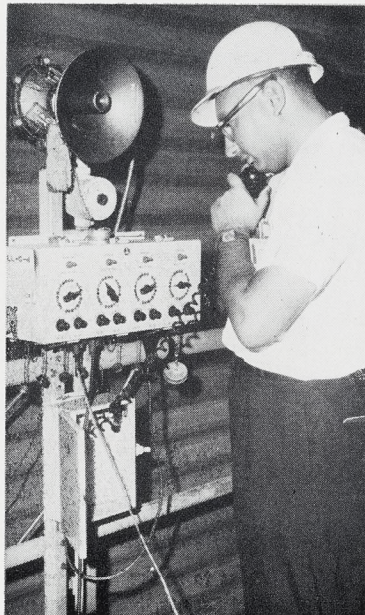
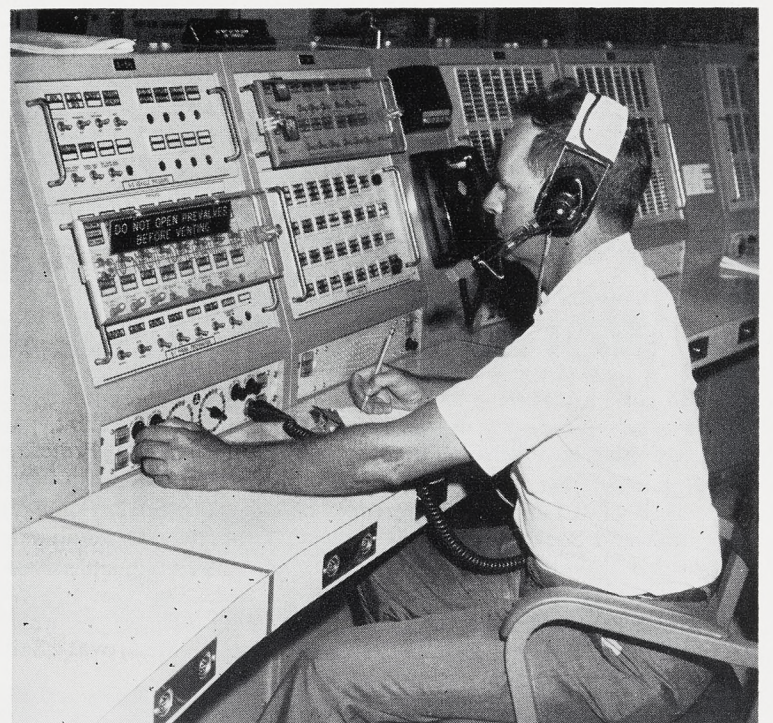
The test laboratory assures the customer that the product is of only the best and most reliable quality. This laboratory, also temperature and humidity-controlled, is equipped to test all Cape Operations-fabricated and vendor-made items for the systems being installed or on older systems being renovated.

The laboratory is capable of testing anything in the communication field from rf to audio, after which all assemblies are certified by the Quality Control Section directed by Jess Huseman.

(See CAPE OPERATIONS, page 5)



Prior to installation (above), A. A. Davidson, Jess Huseman and Rudy Bruna (left to right) conduct final checkout on equipment before installation. Floyd Grady of Site Installation crew (below) continues checkout procedure after installation at fueling director's console in the Launch Control Center.



Among the final steps in systems installation are preparing operations manual by Jocelyn Williams and Iris Supcoe (far left photo). NASA launch personnel (center photo) were shown using part of the Northrop-installed equipment during recent launch of Saturn 1B. Aerial view of Complex 37 (above) gives indication of scattered buildings and facilities.



## NASA PROJECT

## Airborne Expedition Probes Weather Secrets

Mother nature has been coaxed into revealing some of her innermost weather secrets through an unusual series of airborne expeditions supported by Northrop Corporation personnel.

These expeditions involved experiments carried out in flights at low and high altitude over Caribbean thunderstorms, Amazon jungles, Chilean volcanoes, North, Central and South American deserts, swampland and forested areas.

NASA's Ames Research Center and Goddard Space Flight Center cooperated in conducting the expeditions. Dr. Michel Bader of Ames and Dr. William Nordberg of Goddard headed the respective groups involved.

Ten Northrop Norair men assisted by providing aircraft support under terms of an Ames-Northrop contract for these services.

Frank Schroeder was in charge of the Northrop personnel.

## NSA Chapter Plans Orientation Meeting

The Airborne Chapter of the National Secretaries Association will hold its annual orientation meeting for prospective new members August 31 at the Ramada Inn, 9620 Airport Boulevard, Los Angeles.

A panel of well-versed speakers will present "What's My Line" at the dinner meeting which is designed to explain what the NSA is and what the qualifications are for membership.

Deadline for reservations is August 25. Interested parties should contact Verlin Seaman, extension 2131, or Pat Noble, extension 2761, at Norair. Social hour will be at 5:30 p.m., and dinner will be served at 6:30 p.m.



OVER THE ANDES—Norair navigator John W. Kroupa plots the route for the NASA Nimbus satellite-990 aircraft. The six-week program included flights over the snow-covered Andes mountain range (at right), as well as deserts, swampland and the Amazon jungle regions.



nel. Included were John Kroupa, navigator; Frank Brasmeri, flight engineer; Milt Silberber, crew chief; Byron Bolling, flight inspector; Jim Edwards, Ed Mitz, Tom Shackelford, Jack Watson and Pete Wolfe, flight line mechanics.

Ames' modified Convair 990 jet transport, dubbed the "Galileo", was the principal aircraft involved in the six-week program. It logged over 200 hours of flight time without a malfunction or delay with Northrop personnel providing maintenance at a number of remote operating bases during the program.

In addition to its normal bevy of scientific data gathering gear, the "Galileo" was especially equipped with new weather-measuring sensors destined for use aboard weather satellites.

Complicating over-all mission objectives was the exacting requirement of often flying over areas simultaneously with passes of an orbiting Nimbus

weather satellite so that data collected by the aircraft and spacecraft could be later compared.

Tropical areas were of primary importance to the program, since scientists have long felt the earth's weather is created in the tropics. There were special studies of various types of clouds, the moisture content in jungle areas, the energies released in thunderstorms, the amount of infrared radiation various types of soil absorb and emit, and particularly measurements of the earth's heat balance which is felt to greatly influence storm development and dissipation.

After an extended series of flights over varied terrain in the United States, the "Galileo" made a nonstop hop from Ames at Moffett Field near San Francisco to San Juan, Puerto Rico, covering a round-about route to avoid flying over Cuba. The quest there was for thunderstorm information conducted in all types of weather.

NASA's Bob Innis was the chief pilot on this segment.

After a return to Moffett Field, the modified 990 jumped off for Panama, the base of operations for low-level sweeps over the Amazon jungles. With a minimum of navigational aids on the ground, the 990 crew, headed by Pilot Fred Drinkwater, flew exacting routes in both daylight and darkness.

"The Amazon is a most beautiful, but forbidding place," one of the Northrop men said. "At low altitudes, all you could see was miles of lush greenery laced by streams."

From Panama the task force flew to Lima, Peru, for further experiments, then on to Santiago, Chile. The latter route took the force along the crest of the Andes range for approximately 2000 miles, described by a spokesman as "incredibly beautiful". The weather in Chile (where it is now winter) is in direct contrast to that in Panama, the Northrop men found.

Next followed a series of daily flights over the Atacama Desert, said to be the world's driest area.

Hopping over the Andes Mountains, the 990 and its task force next stopped off for day and night flights out of Mendoza, Argentina, before returning to Moffett Field via Panama.

"Our Northrop people were highly impressed by the devotion to duty and the long hours the scientists worked while we were on this program," the Northrop men agreed. "It is a highly rewarding experience to be associated with internationally-famous men and women like these and to be able to contribute to their efforts in a small way."

## AIR FORCE MEN EARN MEDALS FOR 'SKOSHI' PROJECT

Two men, an Air Force major and a technical sergeant, have been awarded Air Force Commendation Medals for their work with the "Skoshi Tiger" F-5 squadron at ceremonies held at Williams Air Force Base, Arizona.

Major Clifford G. Carbaugh and TSgt. William E. Bascue, both original members of the team formed at Williams then sent to Vietnam for combat duty, were the honorees.

Major Carbaugh was chief of Quality Control for the "Skoshi Tiger" squadron (the 4503rd Tactical Fighter Squadron). TSgt. Bascue served as an F-5 crew chief.

## Lee Ober's Brother Running for Congress

The U.S. House of Representatives election campaign in Colorado (Denver) this November will hold more than just a casual interest for Norair's Lee Ober—her brother will be a candidate.

And the circumstances surrounding the candidacy are rather unusual, since the man in question is currently on duty with the U.S. Marines in Vietnam.

Sergeant Gregg Pearson, Mrs. Ober's brother, is a combat correspondent with the Leathernecks and has been in the thick of action for almost a year. He is a former newspaper, radio and television writer and the author of numerous published works.

He was also executive secretary of the Republican Party in Colorado prior to reporting for duty. He rejected a possible nomination for a Congressional seat before reporting for duty. But at the recent Colorado Republican Party Convention he was nominated by acclamation.

Sergeant Pearson was featured in a special Walter Cronkite CBS-TV news program July 18. He was interviewed at his post in Vietnam.

## BENNETT REPRESENTS USA

## World Church Leaders Express Views in Switzerland

It's not unusual for a Northrop executive to attend a conference and serve on a committee on science and technology.

But when that meeting is the World Council of Churches' conference on Church and Society—held in Geneva, Switzerland—that is unusual.

Walker G. Bennett, newly appointed NIKE-X project manager for Northrop Space Laboratories' Huntsville Department, returned recently from that two-week conference. He was one of 56 American delegates at the international meeting; one of two representing the Lutheran Churches in America.

Mr. Bennett, formerly chief of Technical Administration at Northrop Ventura, went to Huntsville seven months ago as director of Business Administration.

He became NIKE-X manager on August 1, reporting to J. A. Barclay, Huntsville Department manager.

The former NIKE-X manager, A. C. (Arch) Wallen, has been placed on special assignment, reporting to Jack Mannion, manager of the Manufacturing and Material Department for Norair.

The personnel changes were announced by Roy P. Jackson, Norair vice president and assistant general manager.

In Geneva, Mr. Bennett and other representatives from nations throughout the world discussed topics ranging from the Vietnamese crisis to birth control. Lay-

men from both sides of the Iron Curtain were present, joined by leading officials from Protestant faiths and the Roman Catholic Church.

There were 440 representatives from 80 nations in attendance.

Mr. Bennett served on a subcommittee, "On Men and Women in a Changing Society," of which sociologist Margaret Mead was chairman.

He also was on the "Science and Technology" working group.

Discussing his part at the convention, Mr. Bennett said:

"The openness, the friendliness of the delegates to one another was a thrilling and a precious thing indeed.

"We were a multitude of faiths and nationalities. I recall an instance where, in our morning worship service, I was

holding a hymnal and singing in English. The man to my left, an Englishman, was singing in French. The man on my right, from Czechoslovakia, was singing from the same hymnal, but in German."

Mr. Bennett also spoke of his meeting with conference delegates from Communist countries.

"I was able to discuss the problems of Christian witness," he said, "with a Cuban minister, a Czechoslovakian psychologist, a Russian Church administrator and a Hungarian.

"I believe the conference afforded a valuable opportunity to exchange ideas and share Christian problems with an untold variety of people. It helped to define the goals and methods of Christian action and witness in a revolutionary world."

Mr. Bennett said he believes the meeting "will affect worldwide church thinking for years to come.

"One of the greatest values of the conference was that we could express our views and get our point across, even if it was not agreed upon."

While an employee of Northrop Ventura last year, Mr. Bennett attended a study conference of the National Council of Churches, in St. Louis.

He has been secretary of the Lutheran Churches Board of Social Ministry for four years, and has been on the board for six.



MEETING IN GENEVA—Walker G. Bennett (Note arrow) listens to an English translation as he attends the World Council of Churches' conference on Church and Society, held in Geneva, Switzerland.



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

Going my way?

Rides Wanted  
7 a.m. — 3:45 p.m.  
Chapman & Hewes, Orange. L. R. Slininger, Norair, ext. 2105, 2106. 2

7:24 a.m. — 4:05 p.m.  
Paramount Blvd. & Stewart & Gray Rd., Downey. Betty Keeton, Maple, ext. 4281, 869-4608. 1

7:30 a.m. — 4:12 p.m.  
Santa Ana, Tustin, El Toro Area, El Toro. Richard Steed, Norair, ext. 1037, 714-837-8963. 3

San Diego Fwy. & Beach Blvd., Garden Grove. William E. Brown, Norair, ext. 1956, 531-5391. 3

8 a.m. — 4:42 p.m.  
Inglewood Ave. & 134th Pl., Hawthorne. Dorothy L. Muzik, Norair, ext. 2123, 2470, OS 6-0790. 5

Inglewood Ave. & 190th Torrance. Jerry L. Peterson, Norair, ext. 2125, FR 1-1096. 5

Airport Blvd. & 96th St., Westchester. Blanche Miller, Norair, ext. 2264, 645-8702. 5

Rides Offered  
7 a.m. — 3:45 p.m.  
Santa Ana, Tustin, El Toro Area, El Toro. Richard Steed, Norair, ext. 1037, 714-837-8963. 13

San Diego Fwy. & Beach Blvd., Garden Grove. William E. Brown, Norair, ext. 1956, 531-5391. 13

8 a.m. — 4:42 p.m.  
Inglewood Ave. & 190th Torrance. Jerry L. Peterson, Norair, ext. 2125, FR 1-1096. 15

Airport Blvd. & 96th St., Westchester. Blanche Miller, Norair, ext. 2264, 645-8702. 15

Personals  
Ironing, in my home, \$1 hr. Hawthorne, 644-2440. L

We wish to express our deep appreciation for the kindness & sympathy of our friends at Norair during our bereavement & the death of our wife & mother. G. E. MUSK, MRS. JACKIE GALICHON. L

For Sale or Trade  
Yamaha, 1964, 250 cc YDS-2 rebilt. to YDS-3, \$395 or trade for car. Rolling Hills Ets., 375-7038. M

Thunderbird, 1961, p/s, p/b, p/w, r/h, auto. trans., low mileage, \$1350 or trade for Volkswagen. Torrance, DA 3-2144. M

Utility Trailer, 4'x6', \$65 or trade for motorcycle trailer. Torrance, 323-0783. M

Tape Recorder, record & playback stereo on 6" reel, RCA cartridge, Silvertone, detached speaker, 2 microphones, 2 mic. stands, \$125 or trade for shotgun, Browning, 12 ga. or 20 ga. pump action. Buena Pk., UN 3-2769. M

Lawnmower, 4-cycle Johnson eng., reel-type, \$30 or trade for rotary-type lawnmower. Torrance, 375-6467. M

Accordion, 120 bass Scandalli, \$100 or trade for portable tape recorder of like value. Box 1605. M

Bowler Gets 298 —But Misses Two

There are a couple of bowling pins at the 101 Bowl, Harbor City, that Norair's Herman Wade would be glad to annihilate—they kept him from his first perfect game recently.

As it is Mr. Wade had a lot to be proud of, a 671 series made up of games of 201-172-298. Not bad for an 180-average kegler.

A strike on his last ball would have garnered the 300 game for Mr. Wade, but he got a 7-10 split instead.

For Sale

Sofa, contemporary design, pale green fabric, 101" width, custom made this summer at \$867, never used, \$400. Bel Air, 472-2571. A

Sailboat, 10' fiberglass, w/dacron sail & trailer, \$250. Long Bch., GA 7-4197. A

Oldsmobile, 1957, factory air-conditioned, 4-dr. sedan, \$325. Thousand Oaks, 805-495-0507. A

Rifle, Remington nylon 66, .22 cal. auto, chromed w/black stock, 6 mos. old, \$45. Hawthorne, 676-4251. A

Sectional, corner sleeper-type, brown & orange plaid, matching backboard, 2 full single beds, \$100. Torrance, 371-9925. A

House, 1-bdrm., in Ventu Park, \$11,500. Newbury Pk., 805-498-3872. A

Skin Diving Equip., complete, \$45. Lynwood, 632-2642. A

Projector, T.D.C. model Streamliner 500 duo for 2"x2" 35mm 2 1/4"x2 1/4" slides, 500W lamp, a.c. blower, 6" f/3.5 lens w/both changers w/case, \$45. San Pedro, FR 2-6585. A

Projector, movie-type, 8mm, Mansfield Holiday, ultra-automatic, used 3 times, \$70. Box 1601. A

Refrigerator, lge. size RCA Whirlpool, 170 lb., pull-out bottom freezer drwr., cost \$550; \$200. Gardena, DA 4-7623. A

Pickup, 1951 Ford, good tires, new brakes, r/h, trailer hitch, \$275. Gardena, 532-4368. A

Range, O'Keefe & Merritt, gas, w/griddle, grilleator, \$65. Hawthorne, 679-2983. A

Auto Parts, block, heads, manifolds, carb. for 430 cu. in. 1964 Lincoln, \$75 or sell sep. Inglewood, OS 6-3095. A

Pups, German shepherd, A.K.C. championship stock, all black & black & silver, \$125. Lawndale, 675-6283. A

Table, round & end table set, white w/brass legs, \$65. Torrance, 371-5916. A

Power Shop, DeWalt radial arm-type, model 925, Banex table, dual volt motor 120/420 V., bitin roto grip motor, other access., cost \$285; \$150. Hawthorne, OS 6-5250. A

Mobile Home, Kit Golden State, 55' lge., 12' wide, ext. living rm., completely furn., many extras, across from Nortronics Anaheim, \$10,000. Anaheim, 714-525-2617. A

Outboard Motor, 1963 Evinrude, 75 hp, push button control, all elec. w/alternator, \$625. Hawthorne, 676-7109. A

Stove, O'Keefe & Merritt, chrome top, \$50. Norwalk, 864-7673. A

Oldsmobile, 1961 2-dr. h/top, r/h, w/w, p/s, p/b, auto. trans., \$1185. Fullerton, 714-528-8582. A

Lot, R-1, in Calif. City, near new elem. school, \$350 dn., \$35 mo., \$3500. P.V., 377-7156. A

Bicycles, 2 boy's, 20", Sting Ray-type, \$25. Long Bch., 596-2039. A

House Trailer, 38'x8' Stewart Coach, eastern blt., fully furn., new awning, \$995. Hermosa Bch., 374-3638. A

Ford, 1965, Galaxie 500 convt., low mileage, \$2200. L.A., PL 6-2587. A

Surfboard, Shool, 9'0", \$50. Inglewood, 678-2728. A

Honda, 1965 250 Scrambler, big jets, \$500. Inglewood, 676-8982. A

Golf Clubs, left-handed, 2 thru 9 irons, 1, 2, 3 woods, \$35. Torrance, 324-9193. A

Cabin Cruiser, 24' Essence, twin screws, twin rudder, fiberglass, range finder, depth sounder, bait tank, other extras, \$1500. Lawndale, 371-7311. A

Juicerator, new, Acme model 5001, cost \$125; \$100. Manhattan Bch., 379-6931. A

Volkswagen, 1966, 1600 TL fastback, 500 miles, \$2100. Anaheim, 714-828-3718. A

Falcon, station wagon, 1961, new tires & paint, o/haul trans., \$350. Hawthorne, 675-1982. A

Car Cooler, Wright's, 6 volts, interior-type, \$25. Inglewood, 756-9697. A

Organ, Hammond M-3 spinet w/percussion, unmarred maple finish, \$795. San Pedro, 831-5837. A

Ladder, extension-type, 32', \$35. Inglewood, 756-9697. A

Ford Falcon, 1965, Sprint, r/h, p/s, fac. air, 2500 miles left on factory guarantee, \$2250. Long Bch., 433-2202. A

T-Bird, 1934, all power, \$2500. Camarillo, 805-482-3740. A

Truck, 1957 Ford V-8 w/pullman camper, good tires, \$550. Redondo Bch., 374-3809. A

House, 3-bdrm. & detached, beam-ceiling den, 1 block to elem. school, near Harbor Fwy., panel liv. rm., fenced playyard, 10 min. to Norair, \$21,900. Gardena, DA 9-2904. A

Pontiac, 1964 Star Chief, 4-dr., auto. trans., p/s, r/h, clock, 1 owner, \$1850. Lawndale, 370-3821. A

Headboards, 2 maple twin size, bookcase-type, \$50. Placentia, 714-524-1787. A

House, 2-bdrm., full dining room, fireplace, dble. garage, \$20,950. Inglewood, OR 1-3860, FR 5-5097. A

Yamaha, YD53, 250 cc, 1965, 1700 miles, \$175 & take over pymts., approx. \$400 bal. or \$575. Torrance, 327-1779. A

Refrigerator, 2-dr. cross top freezer, 13.2 cu. ft. Frigidaire, \$60. Hawthorne, OS 6-5219. A

Boat, 17' runabout, 75 h.p. outboard, Evinrude, 22-gal. cap., many extras, \$750. Inglewood, 679-5827. A

For Sale

Camper, 7', sleeps 4, ice box, stove/ sink, \$250. Torrance, 371-1006. A

Triumph, 1964 TR 6, 2500 miles, \$850. El Segundo, 374-7039. A

House, 3-bdrm., 2-bath, lge. covered patio, bltins, 5 3/4% mortgage, \$141. mo. pymts., \$27,500. Torrance, 325-0039. A

Yamaha, Trailmaster 80, never ridden, factory guarantee, \$250. Hawthorne, 644-3162. A

Ford, 1958 2-dr. sedan, r/h, new motor, auto. trans., V-8, \$395. L.A., WE 4-5640. A

Rug, silver-tipped Himalayan bear skin, beautiful head, \$450. Hawthorne, OS 5-3892. A

Jaguar, 1961 MK IX sedan, stan. equip., b/seats, leather uphol., wood dash & trim, sunroof, disc brakes, p/s, p/b, other extras, \$1895. Redondo Bch., 374-2361. A

Camera, Nikon, 35mm, rangefinder model w/ 50mm f.1.4 Nikkor sc. & 35mm f3.5 Nikkor c., 135mm f-4 Zeiss Sonnar lenses, Universal finder 35-135mm, lens shade & filter mount, w/cases, \$160. Hermosa Bch., FR 2-8547. A

Triumph, 1962, 650 cc, \$575. Redondo Bch., FR 2-4071. A

Outboard Motor, 25 h.p. Evinrude, controls & 5-gal. gas tank, \$75. Gardena, DA 4-8853. A

House Car, 1960 Thames, self-contained, 4 cu. ft. elec. or butane refrig., \$895. Manhattan Bch., 372-4404. A

Chevrolet, 1957 convt., needs top & paint, \$225. Hawthorne, 675-9702. A

Volkswagen, 1300, 1966 sedan, AM/FM radio, deluxe int., w/w, camber compensator, s/ belts, \$1600. Manhattan Bch., 376-1041. A

Falcon, 1963, auto. trans., r/h, wire wheels, will take \$200 for equity, \$400 bal., \$600. Hermosa Bch., FR 2-1013. A

T-Bird, 1961, air cond., r/h, full power, \$1550. L.A., GR 2-8377. A

Vacuum Cleaner, G.E. canister, 3 yrs. old, \$10. Torrance, 327-4585. A

Golf Clubs, 4 woods, 1966 Spalding Top Flite, reg. professional, D-3 med. shaft, 6 mos. old, \$65. Inglewood, OS 9-5731. A

Helmet, boy's football-type, age 8-12, \$4. Gardena, 324-9373. A

Saws, tilting arbor, 10", 1-h.p. motor, 4" jointer & wood lathe w/6 chisels on portable stand, \$150. Hawthorne, OS 5-3080. A

Pups, German shepherd-collie, \$10 ea. Lawndale, FR 0-9440. A

Washer, auto., Kenmore, \$50. Torrance, FR 5-4574. A

Hi-Fi Set, Heathkit 25 W amplifier, leco tuner, Bogen turntable, Jensen 3-way speaker system, \$65. Westminster, 714-892-5801. A

Home, 3-bdrm., 1 1/4 bath, fenced, landscaped w/sprinklers, fireplace, ash paneling, kitchen w/bltins, \$31,000 or \$235 mo. lease. P.V., FR 8-5475. A

Sprite, 1959, 1962 engine & trans., side curtains & tonneau, plus extras, \$350. Port. Bend, 377-2921. A

Plymouth, 1957, 2-dr. sedan, good tires & eng., body needs paint, \$100. Venice, EX 9-2003. A

Pressure Cooker, canning size, 24 qt., Presto, \$12. Pac. Palisades, 454-1963. A

Refrigerator, 9 cu. ft. Admiral, \$40. Torrance, 324-2992. A

Acreage, near Rosamond, in Antelope Valley, E. Kern water dist., 10 acres, terms, \$595 ac. Torrance, FR 8-1026. A

Chevrolet Impala, 1962, 4-dr. sedan, r/h, p/s, p/b, auto. trans., 327 4-barrel eng. \$1300. Redondo Bch., 370-9795. A

Wig, black human hair, & case, orig. cost \$325, almost new, \$250. Inglewood, 674-1730. A

Scout, Int. Harvester, 1962 Warn. hubs & o/drive, 4-wheel dr., 9.15x15 flotation tires, 12V/110V ac/dc generator, steering stabilizer, hvy. duty clutch, \$1700. Hawthorne, OS 6-3388. A

House, 3-bdrm., paneled den, lge. all-elec. kitchen, patio, block wall fencing, 4 3/4% loan or refinance, \$20,950. La Mirada, 944-1734. A

Dodge, 1951, near new tires, \$150. Lawndale, 644-3427. A

Home, 5-bdrm., 3 1/2 bath, on view lot, \$77,000. W. Covina, 339-8008. A

Boat, 14' Nylox runabout, 35 h.p. Johnson, trailer, \$640. Box 1602. A

Record Changer, Garrard, type A, \$50. Inglewood, 674-6395. A

Boat, 12' plastic car top-type, 3/8" thick plastic, wide beam, 3 seats, w/flotations underneath, \$75. Hawthorne, OS 9-7123. A

Outboard Motor, 100 h.p., 1965 Mercury, \$900. Hawthorne, 327-5229. A

Bicycle, boy-girl 20", \$15. Torrance, FR 9-5690. A

Cadillac, 1960, Coupe de Ville, all extras, fac. air, 54,000 miles, \$1450. L.A., 472-5284. A

Chevrolet, 1959, 348, auto., tuck & roll, \$675. Hawthorne, 714-892-7610. A

Porsche, 1960, convt., 1-owner, \$1400. Fountain Valley, 714-962-2747. A

Carpeting, light green acrilan, approx. 50 yds., \$200. L.A., AX 2-1793. A

Encyclopedia Americana, 30 vol., 1963 edition, incl. 1964 thru '66 yearly supplements, 10 vols. Book of Popular Science, plus 1 yearbook, 1965, w/bookcase, \$200. Redondo Bch., 376-8285. A

For Sale

Rollaway Bed, on casters, \$7. So. Gate, ME 3-2395. A

Oldsmobile 88, 1958, p/b, p/s, r/h, dual 90 tires w/15' travel trailer, sleeps 4, complete unit, \$700. Torrance, 328-1076. A

Honda, Dream 300, 1965, windshield, luggage rack, new rear tire, & saddle bags, \$550. Torrance, DA 8-2642. A

Cocker Spaniel, male, blonde, 3 1/2 mos. old, shots, AKC, \$45. Torrance, FR 1-0629. A

Pups, German shepherd, purebred, no papers, \$15. Canoga Park, 341-0517. A

Edger-Trimmer, Craftsman, 3 h.p. 4-cycle eng., \$35. Hawthorne, 676-6122. A

Lot, 80'x100', Snow Summit, Big Bear Lake, 1 blk. from ski slope & inn, all utilities in, financing avail., \$6950. Fullerton, 714-525-1677. A

Rambler, station wagon, 1960 4-dr., stick shift, 6-cyl., 42,000 miles, \$550. Fullerton, 714-525-7685. A

Cabin Cruiser, Glasspar club mariner, 19', Volvo inboard-outboard & trailer, \$2395. Hermosa Bch., 374-7290. A

Wig, 100% human hair, frosted, head form & pins, never worn, \$50. Long Bch., 433-2202. A

Honda, 1962 deluxe, 305 cc, many extras, chrome fenders, racing clutch, \$400. Torrance, 378-8181. A

Oil Filters, Frantz, 2 new, 1 used, \$18 ea.; used, \$9. Los Alamitos, 430-4407. A

Electric Guitar, Tiesco Del Rey dble. cutaway, tremolo bar, \$70. Inglewood, 673-1589. A

Mattress, box springs, twin size, \$10. Long Beach, GA 3-1363. A

Camera, Kodak Signet 80 w/carrying case, 90m.m. telephoto lens, flash gun, \$80. Hawthorne, 676-2383. A

Ford, 1959, 6-cyl., standard trans., w/w, radio, smog device, recent trans. o/haul, \$250. Gardena, 676-0432. A

Corvette, 1961, tonneau cover, 4-speed, positraction, 270 h.p. two 4-barrels, r/h, \$1700. Canoga Park, 882-0248. A

Washer, Maytag, 2 yrs. old, coppertone, \$100. Redondo Beach, FR 5-6364. A

Chevy, 1959, Bel Air, 2-dr., \$375. Inglewood, 674-1847. A

Porsche, 1964 "C" Coupe, Blaupunkt radio, \$3300. L.A., GR 9-5653. A

Acreage, Hesperia, R2 lot, Palm Springs panorama, \$5000. Redondo Beach, 370-4641. A

Condominium, 3 bdrms., 2 1/2 bath, inter-com, fireplace, pool, clubhouse, \$3900 equity for \$1300, balance, \$24,700. Torrance, DA 7-2831. A

Mountain Cabin on hillside lot near Frazier Park, Mt. Pinos area, water heater, refrig., elect. range, septic tank, cess pool, \$6600. Gardena, OS 6-7265. A

Stereo Amplifier, 50 watts per channel, \$100. W.L.A., 277-2549. A

Honda, 1965 Super Hawk 305, scrambler bars, two helmets, \$550. L.A., 277-2549. A

Chevy II, 1964 wagon, auto. trans., new tires, r/h, \$1475. Gardena, 324-0867. A

Fiat, 1960, 600, \$100. Diamond Bar, 714-595-6724. A

Beer Bar, custom made, holds keg, \$150. Hawthorne, 679-8009. A

Wanted to Buy

Sail Boats, Sabot, pram or similar size w/ sail. L.A., 474-8640. B

Outboard Motor, 5 h.p. Evinrude or Johnson, will pay up to \$50. Torrance, 325-8212. B

Used Uniforms for Hawthorne Christian School, boys size 5 or 6. Gardena, 327-0701. A

For Trade

Trade Blue Chip stamps for S&H green stamps. Santa Monica, EX 3-5983. C

Tropical Fish, 5 large angel fish, trade for smaller fish. Westchester, OR 2-4828. C

FREE (To Be Given Away)

Kittens, ready about Sept. 16, blacks, grays, tigers with or without tails, part Burmese & part bobcat. L.A., 277-2549. D

Clothes Poles, 2, heavy duty, good shape. Torrance, 325-8134. D

Rentals Offered

House, 2-bdrm., rear, water & rubbish pd., near Hawthorne plant, \$95 mo. Torrance, FR 8-0500. E

Apt, 2-bdrm., 1-bath, deluxe, small child OK, near Northrop, \$130 mo. Hawthorne, OS 5-2772. E

Apt, 1-bdrm., furn., all bltins, pvt. deck, lge. pool, subterranean parking, near Northrop, \$140 mo. Lawndale, 670-6084, 679-2117. E

Sleeping Rooms, close to Northrop, shopping & transportation, \$32 to \$40 mo. Hawthorne, OS 5-5850. E

Apt, furn., 3-rm., adj. Century City, incl. all utilities, 1 person, \$125. W.L.A., 277-0594. E

Apt, 2-bdrm., 1 1/2 bath, near schools & park, furn. \$155 mo.; unfurn., \$120 mo. Inglewood, 644-2565, 672-1



## STEVENS NAMES AIDE FOR STUDIES ON PROSPECTS

Bill Wills has joined Northrop Nortronics as assistant to the general manager.

The announcement was made by Frederick Stevens, corporate vice president and Nortronics general manager.

Mr. Wills has been manager of Operations Analysis for TRW Systems. Before that, he was manager of Contracts for General Dynamics in Fort Worth. He also spent three years in general law practice.

He is a graduate of Texas Christian University and holds a law degree from the University of Texas.

Mr. Stevens said Mr. Wills will conduct special studies and analyses on the projected growth of Nortronics' business.

## TEAMS

(Continued from page 1)

being maintained at a very warm 122 degrees F.

Qualification tests, which follow reliability efforts in progress, will be more varied in nature, but less repetitive in scope.

Nonoperating temperature tests will find the TEAMS subjected to minus 85 degrees F. temperatures for 36 hours followed by an increase to 167 degrees F. for another four hours and still another four hours at 77 degrees F.

During humidity tests the TEAMS unit will be operated in five 24-hour cycles in which environments will be altered from 122 degrees F. down to 86 degrees F. An eight-hour cycle will find humidity increased to a steamroom-like 95 percent.

Electromagnetic impulses will be focused on the TEAMS unit while in operation. And checks will also be made for TEAMS generated electromagnetic interference during an operational period.

A portion of the cabinet housing the over-all TEAMS unit will be subjected to a 200-hour salt spray test routine to test its corrosive resistance.

A. J. Flynt is serving as the Nortronics project coordinator for the test project, while Bill Clewett provides liaison and on-site guidance. Norair's Dave Gross is the test engineer assigned to the project.



RAMRODDING "ROUNDUP TIME"—All-Northrop family picnic, dubbed "Roundup Time" comes off August 28 at the Los Angeles County Fairgrounds, Pomona. Leaders in planning event are these four men, plus Bob Benedict of Nortronics Anaheim. They are (from left) Dave Carney and Bill Wareing of Norair, Joe Kalina and Bob Marsh of Nortronics Hawthorne-Palos Verdes.

## MATERIAL: Computerized Program Nets Profit in First Year of Operation

(Continued from page 1)

moving through the system.

Transaction codes, about 95 of them, are used to route the material or part through the computerized processes. Each tells the computer what to do in a given situation.

Master files, retained in the form of magnetic tape, store masses of information concerning material control activities. Each is updated at frequent intervals. Currently, these files contain more than 19 million digits of information in the form of letters or numbers.

Computerized auditing and editing have all but eliminated the possibility of invalid information entering the system due to human error possibilities.

Inventory records are currently issued on a weekly, monthly and quarterly basis for those items having activity. They can be issued daily or when special requirements dictate. Each is an up-to-the-minute representation of material activities.

Implementation of MIIS was the result of a closely coordinated team effort involving three major functions — Materiel, Northrop Data Processing and Management Systems.

"Northrop Data Processing has been extremely active in this implementation and continues to make daily contributions to its operating effectiveness," said Dick Shave, chief of Management Systems.

Mr. Shave added: "The con-

cept and implementation of MIIS is primarily due to the ingenuity of E. J. Johnston, chief of Materiel, and R. B. Clay, supervisor of the Business Systems Development unit. Hal Worrell led the NDP team that did the laborious job of converting concepts into computer language. Other outstanding contributions were made by Victor Gausepohl and Dalma Sanzaro of Materiel.

Mr. McInnis lauded the work of all Nortronics personnel involved in material control.

"These people have helped implement an entirely new concept in material control," Mr. McInnis said. "Certainly they deserve a great deal of credit for their timely suggestions and personal efforts."

In addition to its obvious attributes, the MIIS concept is proving to be a major cost avoidance tool. For instance, in its first 11 months of operation MIIS has saved enough to pay for its installation with \$85,000 to spare. Subsequent annual savings are expected to be around \$291,000 over manual concepts of material control operations.

Nortronics has taken the MIIS implementation step as part of a long-range program leading toward a comprehensive Nortronics Management Information System. Automated concepts for Engineering, Manufacturing Engineering and Manufacturing applications are currently under study.

## NRC ROUNDUP

### Womens' Softball Team Works Its Way to Top

After three seasons of frustration—they lost every game the first season, finished second the next two—Nortronics' women's softball team is on a winning spree.

In fact, the NRC nine waltzed through the first half of the Anaheim Industrial League schedule undefeated, winning games by such scores as 17-0, 18-1, 10-2 and 26-4.

Only one loss, an 11-2 setback in the hands of Imperial Paints, has marred the second round with only three of seven games to go.

At any rate the NRC feds will enter league playoffs by virtue of their first-half championship.

Ann Dean is the ace hurler for the Nortronics nine, having won four games, including one no-hitter. In that game, with Dixie Cup, only one player reached second base. A double play and a shoestring catch of one of four balls to enter the outfield clinched her shutout. Alternate and relief pitchers are Debbie Wickersheim and Virginia Bellinis.

Team members, in addition to the hurlers, are Jan Brink, second base and NRC commissioner, Jeanne Grugle, first base, Cindy Harvey, centerfield, Esther Michaels, shortstop, Cheri Swanson, left field, Barb Bauman, catcher, and Ann Thomas, an auxiliary infielder-outfielder.

All games are played at Hanson or Boysen Park, either at 7 or 8:30 p.m.

\* \* \*

### Three-Day Cruise Set by Sailing Club

Northrop Sailing Club will hold a regular meeting at 7:30 p.m. August 22 at NRC Clubhouse, Hawthorne, and a three-day cruise over the Labor Day weekend to Catalina.

\* \* \*

### Flag Football Loops Set to Begin Action

Flag football action gets under way next month at Northrop and team captains will gather tomorrow (August 18) for an organizational meeting set for 11 a.m.

at the Norair Personnel Activities office, Plant 1.

Practice games will be played by all teams September 10 and competition launched September 24. Teams will be made up of seven players with a total allowable roster of 15.

All games will be played at Alondra Park on Saturday mornings. Individuals or teams may obtain entry forms from Personnel Activities.

\* \* \*

### Anaheim Archers Plan Activities

Reactivation of the NRC Archery Club at Nortronics Anaheim is now in progress under the direction of Commissioner Del A. Mott.

Activities include lunchtime shoots (at Nortronics Anaheim) and 5 p.m. (Monday) shoots in the same area. Arrangements have been completed for use of Fullerton Junior College's range Monday, Wednesday and Friday.

Regular club meetings are held at 7:30 p.m. the fourth Thursday of each month at NRC Clubhouse, Fullerton.

\* \* \*

### Labor Day Outing Planned by Campers

The Northrop Wanderers will hold their next campout over the long Labor Day weekend at La Sage Riviera Trailer Park near Pismo Beach.

Advance reservations are required and may be made (August 15 to August 29) with Personnel Activities at Northrop Norair.

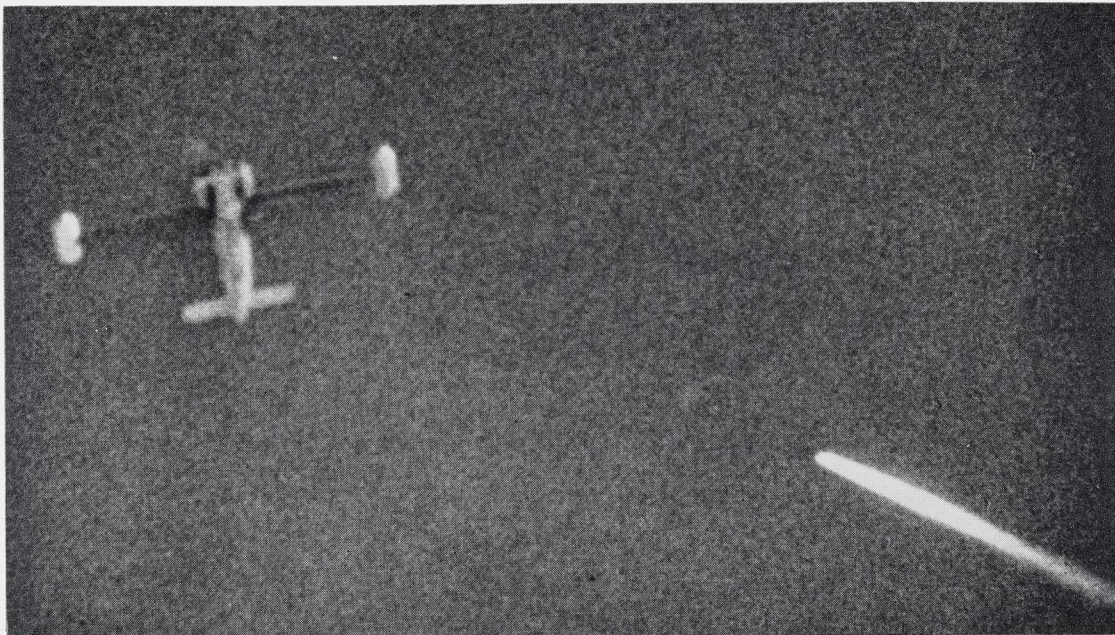
## PICNIC

(Continued from page 1)

at 5 p.m. the grand prize drawing will determine who wins an all-expense weekend for two in Las Vegas or \$100 in cash. Drawings will be as attendance prizes and will necessitate the depositing of family tickets at entrances.

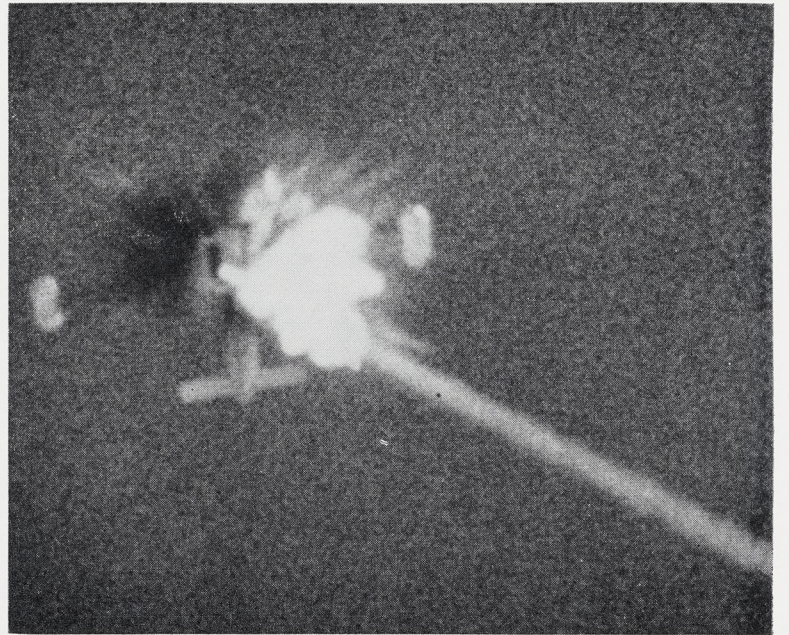
Sponsoring this event, the sixth annual all-Northrop affair, are NRC Councils from Norair and Nortronics. Planning has been led by Bill Wareing, Joe Kalina and Bob Benedict, NRC presidents, and special events chairmen Bob Marsh and Dave Carney.

## REDEYE SCORES BULLSEYE ON NORTHROP DRONE



Some Northrop Ventura drones fly again and again after use as targets for gunfire. But this

six-cylinder KD2R-5 (improved) met destruction on first mission. Army's shoulder-fired anti-



aircraft missile, the Redeye, is shown homing in from right (left photo) and striking drone

(right photo) as both disintegrate. These photos were taken during recent maneuvers.



# NORTHROP NEWS

NORTHROP NORTRONICS

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August 31, 1966

## NSL Building Satellite for Solar Studies

A new synchronous orbiting satellite, being built at Northrop Space Laboratories, will orbit the earth in a perfect circle at an altitude of 19,323 miles while gathering data on solar effects in deep space.

The satellite, named the OV2-5, is being manufactured on a \$981,000 contract from the U. S. Air Force's Office of Aerospace Research (OAR). The OV2-5 is the third such device developed and manufactured by Northrop for the USAF.

Northrop will design, develop and construct the new satellite and deliver it to Cape Kennedy by May of next year for proposed launching as a "bonus" payload atop a Titan III-C booster.

William C. Armstrong, Northrop program manager for the OV2-5, said the principal difference in the OV2-5, compared to its forerunners, is its more sophisticated data system.

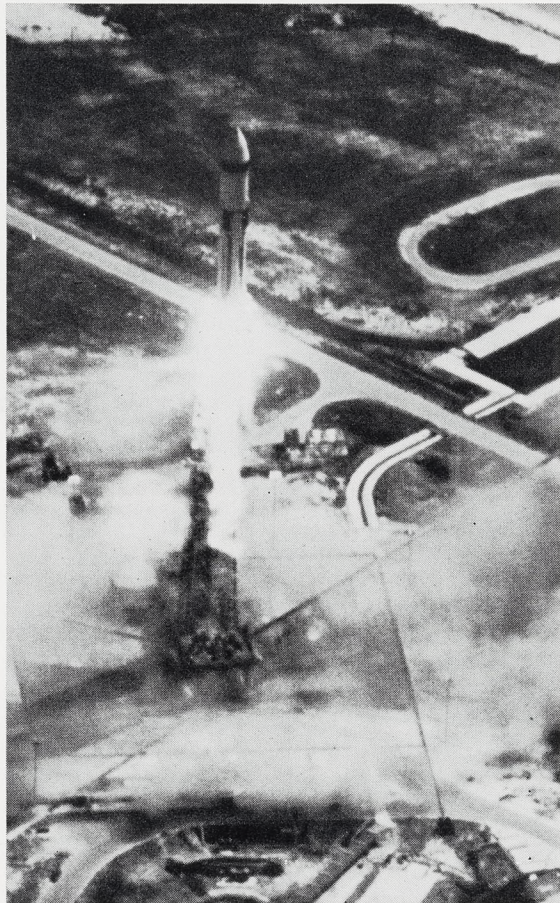
Because of the increased electronic payload, the OV2-5 will weigh approximately 25 to 50 pounds more than its predecessor, the 400-pound OV2-3. The OV2-1 weighed about 360 pounds. The new satellite will be approximately seven feet high and four feet square which is about the same size as the previous OV2 vehicles.

Fabrication has begun at NSL on operating models for thermal, harness, integration systems analysis and antenna tests.

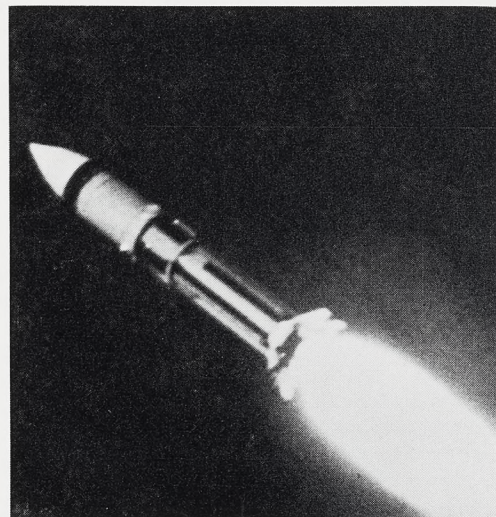
Cost reduction will be accomplished by the use of several compatible subsystems developed for the OV2-1 and OV2-3, Northrop program officials said.

Through the use of solar panels, the OV2-5 is expected to gather vital environmental data and perform experiments on solar effects in space. Northrop Space Laboratories personnel will also train USAF officers to monitor the satellite.

## VIEW FROM 40,000 FEET



ALOTS RECORDS AS-203—Northrop Nortronics' ALOTS (Airborne Lightweight Optical Tracking System) photographs the Apollo-Saturn 203 as it leaves its launching pad at Cape Kennedy. Above, the vehicle clears its tower. In both photos at right, ALOTS uses its 200-inch focal length telescope-camera to record the AS-203 as it passes above 40,000 feet. ALOTS flew at an altitude of 40,000 feet, on a Boeing KC-135. See page 4 for more on ALOTS.



## RETIREEES ELECT INTERIM SLATE OF EXECUTIVES

An interim slate of officers has been named to guide the new Northrop Retiree Club.

Norbert Lorentz, president; Walter Brophy, vice president; and Jeannette Kaupp, secretary-treasurer, will serve until regular elections for the club are held later this year.

The new organization, open to all Northrop Corporation retirees and their spouses, has named a number of committees to map out a general plan of operation.

## Norair Top Management Involved in Major Shifts

In a move designed to provide "the strongest possible deployment of our total management resources," Northrop's Senior Vice President — Technical Richard E. Horner, who has been serving double duty as Norair Division general manager, has returned to the corporate office to devote his full time and energy to his company-wide technical responsibilities.

Northrop President and Chairman Thomas V. Jones, in making the announcement earlier this



Mr. Horner



Mr. Gasich

month, said "the move was taken to strengthen the central planning and leadership of the research and engineering activities of the company."

At the same time, Mr. Jones announced that Welko E. Gasich, Norair vice president and assistant general manager — Technical, would move to the corporate office as a vice president, in order to devote himself to areas associated with corporate growth.

F. W. Lloyd was named corporate vice president and general manager at Norair, succeeding Mr. Horner. Mr. Lloyd has been with Northrop 25 years and for the past seven years has been assistant vice-president and general manager for Operations at Norair.

Roy P. Jackson, who has been manager of Northrop Space Laboratories, was named vice president and assistant general manager at Norair.

Four Division managers were elevated to vice presidents in the reorganization. They are: Milton Kuska, Engineering; Jack Manion, Manufacturing and Mater- (See MANAGEMENT, page 6)

## Last Polaris Submarine Is Launched

A milestone of major significance in modern naval history passed July 21 with the christening (by Mrs. Hubert H. Humphrey) and launch (at Groton, Connecticut) of the USS Will Rogers.

The Will Rogers is the nation's 41st, and last, nuclear-powered, Polaris-armed submarine.

At the conclusion of outfitting and sea trials the Will Rogers will be commissioned (in 1967) and sent to sea to join the 39 other Polaris submarines now deployed on a world-wide basis as a deterrent force which is unequalled for its survivability.

The U.S. Navy's Fleet Ballistic Missile Program, now approaching its goal of completion with the Will Rogers, was a mere concept less than a decade ago.

Northrop Corporation, along with many other firms and organizations, played a major role in transforming this concept into actuality, in turning ideas into hardware.

Northrop Nortronics facilities in the East produced star-tracking periscope mechanisms for the Polaris submarines and equilibrium-gyroscope packages for the submarines and their Polaris weapon systems.

But probably best-known among Northrop contributions are automatic checkout systems built at Nortronics Anaheim.

These remarkably versatile and reliable systems have logged more than one million hours of operation with an amazing 99 percent availability factor to date.

Nortronics entered the Fleet Ballistic Missile Program in 1959, the last electronic-producer to receive a major contract. In short order Nortronics became the first to deliver.

Polaris submarines are general- (See POLARIS, page 6)

## Annual NRC Luau Set September 24

Northrop Recreation Club at Anaheim has booked reservations for a big party September 24 at the newly renovated Luau land at the Palms Restaurant, Fullerton. Which means the big fall social event, the 13th annual NRC Luau, is just around the corner.

The big luau, featuring all the delicacies of the islands, will be at 8:30 p.m. and will be preceded by a social hour.

Keoki's Pearls of the Sea will provide music and entertainment will feature sword dancers, hula swingers and a host of others.

Luau land has added a huge indoor-outdoor facility complete with infrared heating for the comfort of party goers. Other features have also been added to this popular gathering place of the NRC "set" over the past years.

Tickets sell for \$3 each and will be sold through Personnel Activities and NRC commissioners until the house capacity is reached.

## WITH DATICO FROM FIRST

## Ralph Dix Heads Poseidon Program

Ralph C. Dix, a veteran aerospace electrical engineer who was instrumental in the design and development of the first Northrop DATICO automatic checkout system and subsequent systems in this field, is guiding efforts on the new Nortronics Poseidon Program.



Mr. Dix

Details of this work were revealed for the first time recently with the announcement Nortronics is working under terms of a contract valued in excess of \$10 million to develop

automatic test and readiness equipment for the program (NORTHROP NEWS, August 3).

The Poseidon missile, under development to supplement the U.S. Navy's fleet of nuclear-powered submarine weapon systems, will have at least twice the accuracy and payload of the present Polaris missile system.

Lockheed Missiles and Space Company, prime Poseidon contractor, awarded the Phase II contract to Nortronics. The cost-plus-incentive fee contract covering approximately 40 months calls for the design and fabrication of automatic checkout systems for missile testing on both land and sea.

Two basic systems, similar to those designed and built by Nortronics for checkout of the Polaris ballistic missile, will be developed.

One will go aboard the submarines for missile systems test to verify Poseidon's operational readiness, and the other will be used for factory and tender ship testing of both components and systems.

Mr. Dix joined Northrop Nortronics in early 1957 as a design supervisor in the electrical group formed to develop the first DATICO automatic checkout equipment. He has subsequently served as a project engineer, assistant chief project engineer for Polaris, chief project engineer for Polaris, MK-7 Program manager, and chief of the Polaris Project Engineering group.

Mr. Dix is a native of Provo, Utah, a former student at Brigham Young University, and a graduate of the University of Utah.



## FOR ROME, BH

## International Names Executives

Northrop International this month announced the appointments of M. C. Johansen as senior marketing representative in Beverly Hills and Younger A. (Sonny) Pitts as regional director in Rome, Italy. Both men are retired U.S. Air Force colonels.

The appointments were announced by C. R. Gates, vice president-International.

Mr. Johansen's last military assignment was as deputy director of Operations for the 2nd Air Division in Vietnam.

During World War II he was with the 474th Fighter Group in Europe flying P-38 fighters.

After World War II he was with the F-80-equipped 49th Fighter Group in Japan, and the Fourth Fighter Group in the United States, which flew F-86's. He went to Korea with the latter organization.

In 1955 he was in charge of planning and developing the air defense system of Spain. He represented the United States in negotiating the accords un-



Mr. Johansen

Mr. Pitts

der which joint air defense was conducted in Spain, and the plan under which the Spanish Air Force would be trained and equipped for full operational readiness.

Mr. Johansen holds the Distinguished Flying Cross, the Bronze Star and the Air Medal with oak leaf clusters.

Mr. Pitts will be responsible for Northrop International's diversified activities in the Mediterranean area, and will report to the Northrop Paris office which supervises Northrop International operations in Europe, North Africa and the Middle East.

Mr. Pitts studied engineering at the University of Missouri and Centenary College in Louisiana, prior to entering the U.S. Military Academy at West Point from which he graduated with a bachelor of science degree in 1943.

He saw World War II service in the China-Burma-India theater, in squadron and group command positions.

After World War II he served in Panama, Germany and California as a jet fighter squadron commander. In 1955 he was appointed director of Airborne Weapons Programs at the Air Defense Command headquarters in Colorado Springs, Colorado, and subsequently commanded a fighter group in Portland, Oregon.

From 1960 until 1963, Mr. Pitts served in Oslo, Norway, as assistant chief of staff for air defense, Allied Forces Northern Europe, where he was an advisor to and represented the commander-in-chief, Allied Forces Northern Europe, in international planning for NATO.

Just before joining Northrop, Mr. Pitts was with the office of the Joint Chiefs of Staff in Washington, D.C., where he participated in operations and policy planning. This assignment took him to Vietnam, Thailand, and other Pacific areas. While in Vietnam he flew on operational missions against North Vietnam in conjunction with his responsibilities.

A command pilot, he holds the Silver Star, Distinguished Flying Cross with two oak leaf clusters, Legion of Merit, and the Air Medal with three oak leaf clusters.

Mr. Pitts is a graduate of the Armed Forces Staff College, the George Washington University Resources Management course, the National War College, and the George Washington University Graduate School of Political Science where, specializing in politico-military affairs, he was awarded a master's degree in International Relations.



Under-Secretary of the Air Force Norman S. Paul (left) presents an Air Force Cost Reduction Award to W. S. Kosidlak, Norair value engineer.

## AUSA Invites Us To Disneyland Nite

The Association of the United States Army (AUSA) has invited all Northrop employees, their families and friends to join its members for an evening of fun at Disneyland, October 28.

Tickets at \$3.75 per person, will go on sale at all Northrop facilities September 6. The price includes admission to Disneyland and unlimited use of all Disneyland attractions. Children under three years will be admitted free.

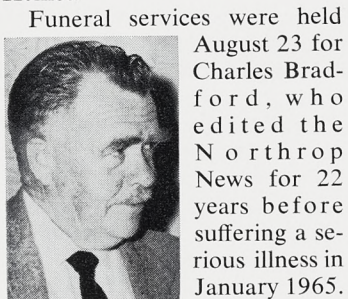
Personnel Activities officials pointed out that only 1000 tickets are available to Northrop employees.

## NO LABOR THIS DAY

All Northrop Corporation facilities will suspend operations Monday, September 5, in observance of Labor Day. Regular work shifts will resume Tuesday, September 6.

## Charles Bradford Dies, Editor For Two Decades

One of Southern California's most distinguished industrial editors died August 20 in Hemet.



Mr. Bradford

Funeral services were held August 23 for Charles Bradford, who edited the Northrop News for 22 years before suffering a serious illness in January 1965.

Services and interment were in Hemet, where Mr. Bradford had been recuperating.

He is survived by his widow, Martha, and a son, William.

Mr. Bradford joined Northrop in 1942. Just last month he was made a Life Member of the Southern California Industrial Editors Association, the highest honor that organization can bestow upon a member.

During his career he won 18 separate awards from the SCIEA for such accomplishments as feature writing, use of photography and newspaper

layout. He also was frequently honored for editorial support of community service projects.

In 1951 he was president of the SCIEA and a vice president of the International Council of Industrial Editors. In 1955 he was named editor of the year by SCIEA.

In 1959 he received a public service award from California Governor Edmund G. Brown at the California State Fair and Exposition for a feature story. The Merchants and Manufacturers Association award was won by Mr. Bradford in 1957 for an unusually effective presentation of management's viewpoint on an important issue of the day.

He served a term as president of the Northrop Norair Management Club in 1953.

Another improvement has been incorporated on Northrop's F-5 jet fighter, with the addition of a newly designed miniature quick-disconnecting electrical connector.

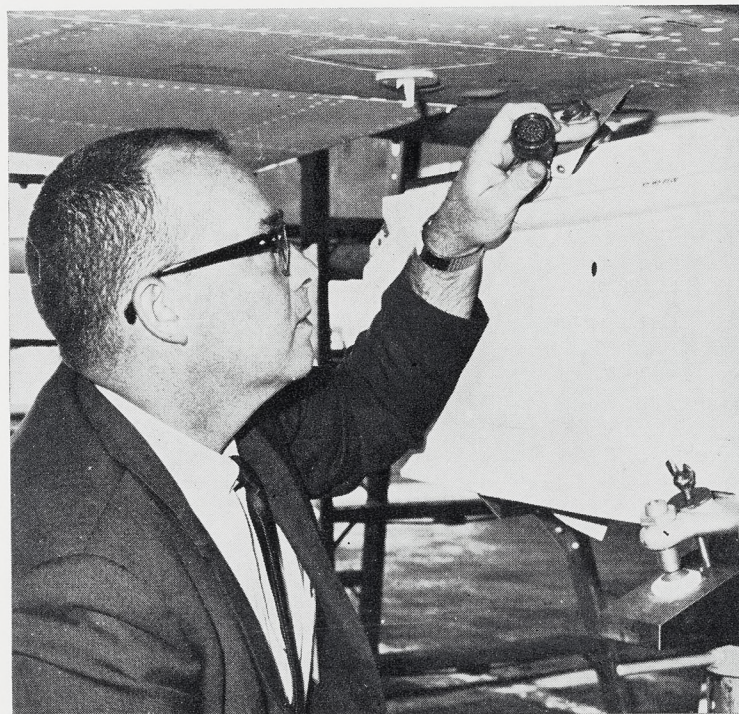
The connector, developed by Norair senior designer Jerry Acord, enables F-5 pilots to immediately jettison center line wing stores pylons when it becomes necessary to lighten the aircraft.

This means the F-5 is able to make a faster getaway in case of combat emergency.

The connector, Mr. Acord said, is one-third smaller than competitive designs, has only six parts, compared to 12 for earlier types, and weighs only 3.2 ounces. It also costs less to manufacture than other designs.

Mr. Acord decided to study possible improvements in earlier connectors, but found nothing on the market which he believed was satisfactory for the job.

So he engineered the new connector himself, in his garage, then borrowed a friend's lathe and built the first one by hand.



NEW CONNECTOR FOR THE F-5—Senior designer Jerry Acord of Northrop Norair examines the installation of a new type of electrical connector beneath the wing of an F-5. Mr. Acord designed the quick-disconnecting connector, one-third smaller than earlier types. The new design is being installed in all F-5's.

## VALUE ENGINEER RECEIVES AWARD AT AF WORKSHOP

Ever think about the time required to paint insignia and letters on an airplane? A value engineering team headed by W. S. Kosidlak, a Northrop Corporation lead engineer did — and ended up saving the company more than \$38,000 a year in placing 250 markings on each T-38 Talon and 320 on each F-5 Freedom Fighter produced.

Mr. Kosidlak accepted an Air Force Cost Reduction Award for Northrop Norair August 17 at the International Hotel, site of this year's AF-Contractor Cost Reduction Workshop. The award was presented by the Honorable Under-Secretary of the Air Force Norman S. Paul.

Team members are: I. Van Velsir, value analyst; J. Ralston, process engineer; C. Wiedmann, design engineer; and R. Patterson, buyer.

For years stencils and silk screens had been used at the Norair Division to paint exterior markings (such as AF insignia, ID numbers and warnings) on production aircraft. Due to varied color and size of markings and letters required, several operations, with associated cleaning and drying periods, were necessary. The procedure was time-consuming and thereby costly.

The new technique developed by the Norair Value Engineering team uses specially produced 3M Company Scotchcal markings which are processed in the marking shop. Production multicolor Scotchcal stock is selected, cut to size and packaged for appropriate F-5 or T-38 aircraft application.

Installation of aircraft markings now involves only removal of backing, application and edge sealing. This results in reduced man-hours required for the job. Additional savings are recognized from quantity production of the Mylar decals by the 3M Company.

## PRODUCT LICENSING

## Another Invention From Acord's Garage

He took his design to Stan Peterson in Corporate Licensing, and Norair granted a license for manufacturing the connector to AVDEL Incorporated of Burbank.

Under the licensing agreement, AVDEL began producing the aluminum-alloy connectors, and they are being installed on F-5 aircraft.

When the pilot decides to jettison the pylons, he presses a switch or button which initiates firing of the bolts, releasing the pylons. Gravity does the rest.

Mr. Acord, a 15-year man at Norair, has submitted 11 patent disclosures. Of these, Norair has licensed four; two on safety switches; two on switch actuators.

Mr. Acord, his wife and three children live in Lakewood. He joined Norair as a template maker and master layout man, and has been in Engineering for five years.

The new connectors will be adaptable to nearly all types of military aircraft, he said.

## 'Khartoum' Selected By Theatre Group

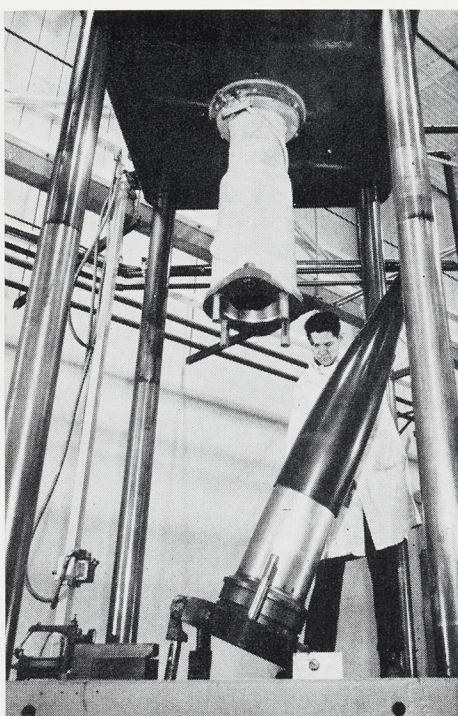
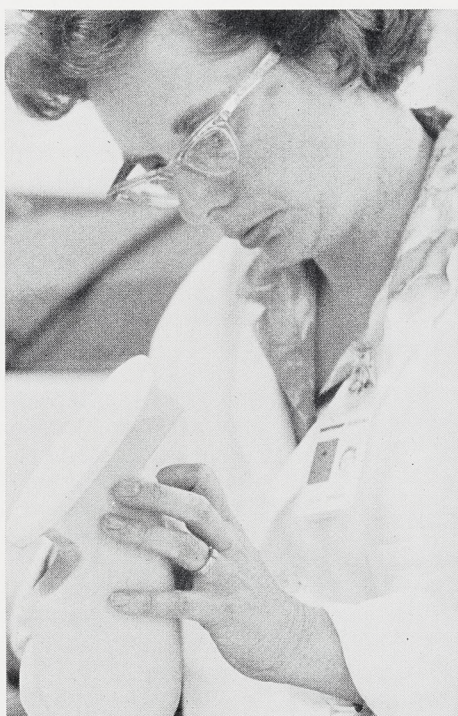
Northrop Recreation Clubs are combining to sponsor an all-Northrop theatre party September 17 for the 5 p.m. showing of "Khartoum" at the Pacific Cinerama Dome Theatre, Hollywood.

Regular \$2.75 loge seats will be available for \$2.35 and \$2.50 orchestra seats for \$2.15 through NRC sponsorship. All seats are reserved. Tickets may be obtained through Personnel Activities at each Northrop facility.

## DIVIDEND DECLARED

The board of directors of Northrop has declared a quarterly dividend of 25 cents per share, payable September 17 to stock of record September 2.





**WORK UNDER 'TENSION'**—Tension wrapping is a part of hand laminating work at Northrop Ventura Plastic Products branch. Here, Zelda Hampton (left) and Theda Thwing wrap cooling ducts.

**A 'CURE' FOR PLASTIC**—Joe Pavano (left) wheels a T-38 subassembly into a huge curing oven. At right, John Baldonado takes a completed RP-76 nose cone from a hydraulic press.

## STUDY IN VERSATILITY

# Plastics—From Drones to Big Jets

By JAY BERMAN—Northrop News Staff

Not too many years ago, the uses of plastics were limited — and the future growth of the plastics industry appeared to be equally limited.

In the past decade or so, however, all that has changed.

The automobile you drive undoubtedly has plastic or vinyl upholstery, interior trim and other parts.

Plastics in the packaging of food and household items has all but replaced many other packaging products.

And in industry, the technologies of plastics have more than kept up with the times.

At Northrop Ventura, the diversity of the Plastic Products branch covers the spectrum from the fabrication of minute subassemblies to large wing fairings for the Boeing 747.

Plastics in most consumer goods and in industry are not the same, although they are closely related. Most consumer-oriented plastic products are injection moldable grades of non-reinforced plastics, while plastics in the aircraft industry is centered around reinforced fiberglass.

There are many types of plastics, and many applications, and virtually all are utilized at Ventura.

Four basic types of work—vacuum forming, hand laminating, compression molding and foaming operations—are included.

Vacuum forming is just what the name indicates.

A vacuum is created by pumping the air from a mold, over which a heated sheet of Royalite plastic has been sealed.

As the air leaves the mold, the warmed plastic assumes the shape of the mold. After the part is formed, it is cooled and retains the shape of the mold.

Vacuum forming also is used in the building of some parts for Northrop's F-5 and T-38 planes.

Hand laminating, the process used to make cooling ducts for the F-5, involves the use of "pre-preg," glass cloth pre-impregnated with epoxy, polyester or phenolic resin systems.

The pre-impregnated glass cloth is laminated to the necessary thickness by hand after application of a vacuum bag, and then the material is cured in one of three large, gas-fired ovens in Plastic Products.

Much of the work is done by the 17-woman, 3-man laminating and fabricating group, headed by Supervisor Mary Gates.

Other Plastic Products supervisors are Ray Burdette, who has the Shift 2 operation, and Ray Escott, who has the press, trim and finishing section.

Laminated plastics have the advantage of high heat and electrical insulation, good machineability, wear resistance, and resistance to steam, oil, solvents, and corrosive atmosphere.

Compression molding is similar to metal stamping. Male and female molds have close fitting, and telescoping circumferential area to seal in resin and trim reinforcement. A mat (fiber batting) is positioned in the mold, a measured amount of resin is poured in, and the heated mold is closed under pressures sufficient to close the mold to the specified thickness.

Advantages of compression molding are: Rapid production rates, good quality, excellent consistency, reproducibility and excellent surface finish.

The nose section, aft section, fairing, wings, horizontal and vertical stabilizers used on Ventura's RP-76 target drone are excellent examples of compression molding techniques at their best.

Foaming operations include the use of a hollow mold, a foam plastic in liquid form and a catalytic agent, to make the actual foaming take place.

(See PLASTICS, page 4)



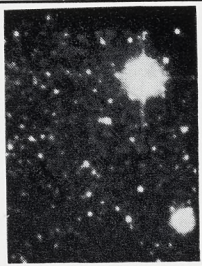
**VERSATILITY AT WORK**—Fred Howard (above) finishes an NV-105 tail assembly. John Jarose (below) pre-forms a honeycombed assembly on an aircraft duct lip. And below left, Hazel Johnson and Mary Goddard are busy with hand laminating operations.





## AD ASTRA PER ASPERA

## Photo-Optical Engineers Honor Jack Gantz for ALOTS Work



The Society of Photo-Optical Instrumentation Engineers (SPIE) has conferred an honorary award upon Jack Gantz of Northrop Nortronics for his contributions to the development of the first optical tracking system used to record the launch and separation of spacecraft and missiles.

The award was made Aug. 24, at the annual SPIE convention at the Chase Park Plaza Hotel in St. Louis, Missouri.

Mr. Gantz is project engineer for Northrop Nortronics' Airborne Lightweight Optical Tracking System (ALOTS), which was designed and built for the U. S. Air Force Eastern Test Range.



Mr. Gantz

Mr. Gantz supervised and worked on all phases of development for the new tracking system.

ALOTS, which is installed on a KC-135 aircraft, is now operational at Cape Kennedy, and has recorded several Gemini launches and other missile shots.

Flying at an altitude of 40,000 feet, ALOTS provides above-the-weather, high resolution photographic trackings of space shots, and is giving space officials close-up views of critical staging separation operations.

The primary advantage of ALOTS over ground-based systems is its ability to perform under almost any weather condition. The altitude at which the aircraft flies puts ALOTS above 75 percent of the earth's atmosphere.

Mr. Gantz, a graduate aeronautical engineer from Cal-Aero Technical Institute, has also completed graduate studies in mechanical engineering at New York City College and the University of Southern California.

He joined Northrop Nortronics in 1959, and has almost 20 years experience in the design, development, production and management of pre-

cision optical-mechanical components.

Other projects with which Mr. Gantz has been associated include: development of long-range sun and earth sensors for the JPL Ranger and Mariner spacecrafts, design of the MMRBM star tracker, and the star tracker for the Navy's Compass Island.

### Technical Information

Helping busy engineers and scientists locate and use technical information now available was the topic of two special presentations for Northrop Corporation personnel made recently.

The presentations are part of a User Orientation Program developed by the American Institute of Aeronautics and Astronautics in collaboration with NASA. Edward Ledeen of the AIAA headquarters staff made the presentations at Northrop Norair and Northrop Ventura.

Milt Kuska, Norair vice president—Engineering, and other top members of Technical management were briefed on the system recently and requested the presentation be made before key Northrop personnel.

Basically, the program is aimed at making the individual aware of the many products and services available in the field of technical information and how he may have access to this information through his own technical information center or library.

Included are information on journals, special publications, cumulative indexes and many types of NASA-conducted or sponsored research programs. There is also information on library and bibliographic services, microfiche, computer information retrieval and Selected Current Aerospace Notices (SCAN), NASA's new computer system for disseminating current information more quickly and efficiently.

Similar presentations are being made at other aerospace firms, NASA Centers, libraries and universities across the nation.

## PLASTICS: Versatility in Products, Craftsmanship and Technology

(Continued from page 3)

The newest — and possibly largest — operation in Plastic Products is the Boeing 747 contract.

Under terms of the letter contract, Plastic Products will build wing fairings and cab fairings for the huge jet.

The honeycombed and reinforced fiberglass wing fairings will fit at the junction of the wing to the fuselage. The cab fairings, made of the same material, will sit atop the airplane, directly behind the pilot's cabin.

Tentative plans call for the cab fairings to be delivered to Boeing in Renton, Washington, between December 1967 and September 1971.

Wing fairings are scheduled for delivery between May 1968 and March 1972.

Both will be shipped directly to Renton from Ventura.

Designs are being prepared for both types of fairings. A team of 17 Ventura engineers is in Renton, making plans for the 22-section wing fairing and six-section cab fairing.

Design on the wing pieces is scheduled to continue through February. The same work on the cab fairings is scheduled to be completed next May.

Final detailing work will be completed in Ventura. After that, the project will be turned over to Plastic Products, for fabrication.

Harry McLaughlin is foreman of Plastic Products. Personnel lists in his branch show 65 workers, up from 40 only three months ago.

In anticipation of future work, Mr. McLaughlin said:

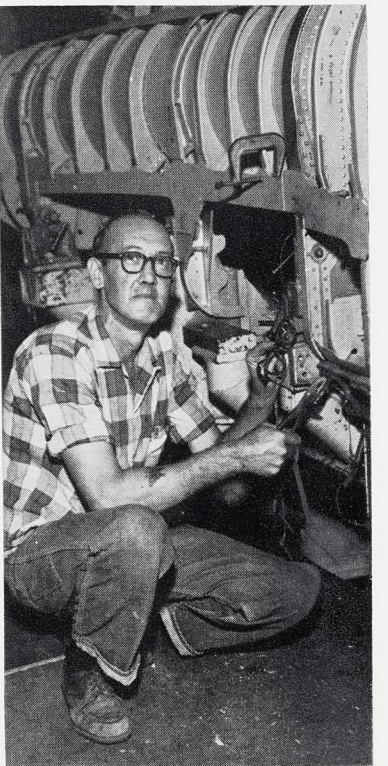
"We are increasing our plastics oven-curing capability by

at least 100 percent, and creating a capability for manufacturing larger parts."

The more that Plastic Products is called upon, the happier Mr. McLaughlin is.

"The more new methods and processes we get, the better we like it," he said.

"We like the challenge of new products. You need new operations in plastics from time to time so that things don't get too static."



Carl D. Cleeton became Northrop Norair's 81st candidate for membership in the Wise Owl Club after an accident in which safety glasses prevented possible loss of eyesight. Mr. Cleeton was removing broken drill bit from assembly, his pliers slipped and broke his safety glasses, but no injury was sustained.

## 'YELLOW PERIL' STRIKES PILOT ON BOMB RUN

The *Stars and Stripes* reported this month an unusual attack on an F-5 fighter pilot during a combat mission in Vietnam with the 10th Fighter Command Squadron.

Pilot Jim Martin was on the second bombing run of his 16th mission when he felt a thump and looked down. There, slithering like a snake from under his seat pad, was this yellow thing.

It started to wrap itself around his leg, then changed its mind and went for the controls.

The one-man inflatable life raft in his seat survival pack had inflated itself automatically and crawled out into the cockpit with the pilot.

First it jammed the control stick hard over to the right, sending the supersonic jet into a corkscrew spin. Then it blocked off the pedals, cutting the pilot off from the controls. The raft blocked his hand from reaching the radio button.

But as the jet corkscrewed, wind pressure on the wings slowed it down enough to allow the pilot to reach the survival knife sheathed on his G-suit. Slashing, thrashing and thrusting, he finally hit a vital spot. The raft shuddered, collapsed and died.

Pilot Martin rejoined his wingmen and finished the mission with several strafing runs.

## Mobile Training Unit on Tour For F-5 Classes

A Northrop-built F-5-109 Mobile Training Unit (MTU), accepted this month by the Air Force's Training Command (ATC), is destined to become a world traveler.

It will be utilized by a special ATC Instructor Team for conducting F-5 training classes anywhere in the world a requirement is established.

Eight other Northrop MTU units are currently in use for this purpose, one at Williams Air Force Base, Arizona, the remainder in allied nations that have received the F-5 as part of their defense force.

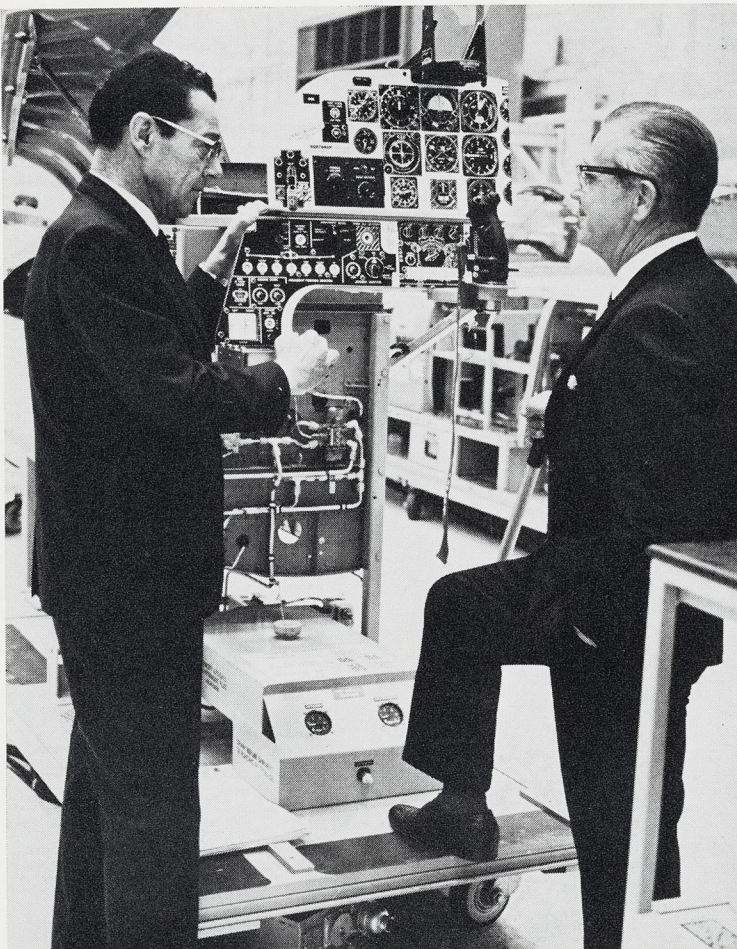
Each MTU is an ingenious assortment of 14 individual trainers, two equipment groups of related support equipment and a set of approximately 800 technical training transparencies or slides. The combined MTU is lightweight, compact, transportable by air and entirely mobile on the ground. It contains its own power equipment, aerospace ground equipment and technical orders.

When operated by special Instructor Teams, the MTU is an ideal means for teaching aircrew and maintenance personnel exactly how each F-5 component and system works and its relationship to all other systems. Trainees may actually operate the system under simulated field conditions, over and over again, if necessary,

until they are minutely familiar with each movement and action.

Normally, aircrew and main-

tenance personnel receive their first training on the F-5 on the MTU located at Williams Air Force Base.



WORLD TRAVELER—Harry Blocher (left) of Product Support and Rex Thornhill of Advanced Production chat beside Northrop F-5-109 Mobile Training Unit, designed for ATC use around the world.

A graphic example of the use of the F-5 MTU is evidenced in the more than 1200 students from many nations—Ethiopia, Greece, Iran, Korea, Norway, The Philippines, Taiwan, Thailand, Turkey, Canada and the United States—who have been trained in F-5 maintenance work there.

Instructors for these courses have been an ATC Instructor Team. Two other teams have traveled around the world assisting nations obtaining their own MTU systems. These two teams have assisted the returning cadre, graduates of the Williams training, in setting up their own training programs.

Two organizations at Northrop Norair are responsible for the design and fabrication of F-5 MTUs—Customer Training of the Product Support department and Advanced Production of Manufacturing. Direct responsibility falls to Harry Blocher and Rex Thornhill respectively.

Since 1952 this design-production team has turned out 19 sets of MTU and performed six other modifications of MTU. They were developed for support of the F-89 interceptor, the Snark missile, the T-38 trainer and the F-5 fighter. They represented a total of 400 system trainers and 8600 training transparencies.



Classified

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private business are not accepted. The Northrop News reserves the right to edit or omit ads. Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

**For Sale**

**Couches**, 2, 7', custom-made, all down, \$900. Beverly Hills, TR 6-6416. A

**Dining Room Set**, 12 chairs, 3 leaves, other antiques, \$850. Box 1701. A

**Corvette**, 1962, radio, 4-sp. positr., comp. clutch & suspension, removable h/top, 327 cu. in., avail. 1st week in Oct., \$1875. Gardena, 532-5086. A

**Carburetor**, C series A.F.B., fits Ford 272-312 manifold, \$15. Hawthorne, OS 9-6215. A

**Organ**, Hammond M-3 spinet w/percussion, unmarred maple finish, \$795. San Pedro, 831-5837. A

**Sofa Bed** & matching living room chair, pink, \$75. Redondo Bch., 374-1124. A

**Couch**, beige frieze, chair, \$40. L.A., PL 5-1925. A

**Triumph**, 1962, TR3, \$1175. Calabasas, 889-9495. A

**House**, near Northrop, 2-bdrm. & paneled den w/fireplace, alum. siding, det. 2-car garage, 10% down, \$23,500. Inglewood, 676-2958. A

**Tent Trailer**, Sears "Ted Williams" camper model, used 4 times, provides 7'x12' tent, dble. bed, storage, includes extra ground tarpaulins, \$300. Rolling Hills Estates, DA 6-1420. A

**Ford**, 1956, 4-dr., rebilt. trans. & carb., \$100. L.A., PL 4-1628. A

**House**, 3-bdrm., 2-bath, dble. gar., large fam. rm., about 5 yrs. old & 20-25 min. from Northrop, existing 5 1/4% loan for \$18,500, owner will take 2nd on part of balance, \$24,000. Wilmington, 830-0740. A

**Enlarger**, prof., 5x7 Elwood, 8x10 Studio View camera, 12" lens, 9' sink, 20x24 stainless steel trays (cust. made), extra darkroom access., other cameras, \$1000. Hermosa Bch., FR 9-7342. A

**Home**, 3 years old, 3-bdrm., 2-baths, fam. room, large lot, block wall & patio, near schools, park & shops, \$25,750. Torrance, 834-4948. A

**Honda**, 1965, 250 Scrambler, 25mm jets, \$500. Inglewood, 676-8982. A

**Sofa & Chair**, Hollywood, re-upholstered, 4 mo. ago, \$50. Redondo Bch., 371-9724. A

**Motorcycle**, Bultaco Mercurio 1965, 175 cc, chrome tool box, \$450. Inglewood, PL 6-7681. A

**Golf Clubs**, 8 irons, Wilson, reg. prof., matched set, 2 thru 9, \$16. Inglewood, OS 9-5731. A

**Lamp**, fluorescent drafting, light green, 15" arms, \$15. Hawthorne, 644-1958. A

**Volvo**, 1963, 2-dr., one owner, \$1350. South Gate, LO 6-1226. A

**Ford**, 1962, T-Bird, new tires, brakes, paint, full pwr. & air, \$1525. L.A., 645-5610. A

**Mountain Cabin**, Idyllwild, 3-bdrm., den, sewing rm., 1 1/2-bath, elec. kitchen, fireplace, gas, heat, 100x150 lot, \$17,200 loan, low dn., \$19,300, Anaheim, 714-535-6712. A

**Chest**, early Amer., 7-dwr., & satin vinyl king bed head, \$50 ea., Palos Verdes, 378-8181. A

**Breakfront**, French prov., & server fruitwood, \$150 or will sell sep. Huntington Bch., 714-892-5018. A

**Volkswagen**, 1964, low mileage, \$1250. Garden Grove, 714-530-1237. A

**Home**, 2-bdrm., walk to Northrop, R-3 w/comm. pot., GI appraisal \$16,300, \$15,500. L.A., 754-4098. A

**Radio**, Heathkit DX100, phone & cw. transmitter, \$69. Hawthorne, OS 6-6949. A

**Chevrolet**, 1961, Impala, V8, stick, 2-dr. h/top, \$900. Santa Susana, 805-527-1621. A

**Front End**, fiberglass, w/bubble, tilt kit, & tow bar for 1957 Ford & other auto parts, \$225. Rolling Hills, FR 7-3487. A

**Mercury**, 1955, 2-dr. h/top, air, p/b, new tires, \$200. Hawthorne, 644-3263. A

**House**, 50x135 lot, landscaped, blockfenced yrd., dble. gar., builtin range & oven, forced air heat, fireplace, \$24,000. Torrance, 328-3512. A

**Studio Couch**, maple, \$70. Hawthorne, OS 6-3410. A

**Camper**, Gem Top (cab high) for '61-'65 Ranchero pickup, louvered windows, \$80. Torrance, FR 1-1096. A

**Motorcycle**, 1964 Triumph, 650cc, \$800. Inglewood, 674-1847. A

**Condominium**, 4-bdrm., 2 1/2-bath, bltins, incl. stove, d/washer, washer, dryer, garb. disp., screened in patio, pool & rec. bldg. accessible, pets, children welcome, schools nearby, shop walking dist., \$24,950, terms. Anaheim, 714-635-1686. A

**Knitting Machine**, \$20. Gardena, 329-5369. A

**Ford**, Coupe, 1948, 3rd owner, orig. paint, 1963 Chevy eng., new int., over \$1600 invested, \$1000. Torrance, FR 8-1350. A

**Encyclopedia**, Collier's, 24-Vol. & Jr. Classics, w/Bibliograph Index and yearbooks to 1965, \$275. Inglewood, 671-5242. A

**House Trailer**, 30-ft., bathrm., shower, etc., fully furnished, \$500. Inglewood, 674-1885. A

**For Sale**

**Ford**, 1961, 2-dr., 2-tone Cruiso, 390 cu. in. T-Bird eng., new brks., good tires, spot lite, \$535. Rolling Hills Ests., FR 7-3744. A

**Dining Room Table**, w/6 chairs, 2 w/arms, chair cushion incl., \$169. Wilmington, 371-3257. A

**House**, 4-bdrm., 1 1/4-bath, f/place, unusual kitchen, dishwasher, garb. disp., bltins, fenced yard, landscaped, 3 1/2 yrs. old, \$26,000. Torrance, 834-2175. A

**Living rm.** outfit, maple bdrm. set, kitch. set, end tables, coffee table, take over pymts. of \$18.11 or \$300 complete. Fullerton, 714-879-5697. A

**MGA**, 1960, 1600, needs body work, \$500. Harbor City, 325-5705. A

**Heathkit**, HA-20, 6-meter linear amp., push-pull 6146 final amps. 125 watts, \$80. Lakewood, 865-7893. A

**House Trailer**, Stewart Coach, 38'x8', east-ern-bit., fully furn., incl. full bath, refrig., butane stove, \$995. Hermosa Bch., 374-3638. A

**Sailboat**, fiberglass, 8'4", dink kitten racing class, black hull, white int., good woodwork, \$200. Hawthorne, 675-6282. A

**High Chair** & play pen w/pad, ea. has tublr. met. frame & is folding type, \$25. Santa Monica, EX 4-8641. A

**Home**, 3-bdrm., 1 1/4-bath, fenced, landscaped w/sprinklers, fireplace, ash paneling, kitchen w/bltins., \$31,000, or will lease \$250 mo. Palos Verdes, FR 8-5475. A

**Motorcycle**, Glera, 1965, 202 cc, 4-cycle, 90 m.p.g., \$325. Manhattan Bch., 376-6790. A

**M.G.-T.D.**, 1953, recently rbilt., many spare parts, shop manual, \$600. Anaheim, 714-774-2897. A

**TV**, 21" RCA, Victorian cab., new cost \$400, \$35. Marina Del Rey, 675-2642. A

**Pups**, German shepherd, 6 wks. old, p/bred, black & tan, \$35. L.A., 645-4697. A

**Coins**, hand-picked choice 1941-'65 Lincoln sets in Whitman folders, \$3.50, also Lincoln rolls, most years. Torrance, DA 6-5558. A

**Condominium Home**, 3-bdrm., 2 1/2-bath, intercom., f/place, bltins, pool clubhouse, \$3900 equity for \$1300 bal. \$24,700. Torrance, DA 7-2831. A

**Ham Equipment**, transmitter, 150 watt Vefo. controlled & crystal, night T150 80 - 6 meters, receiver, National 270, 80-6m, \$300. Terrance, 325-8212. A

**Oil Painting**, 23x36, blue & white winter theme, in blue & gold frame, \$50. Torrance, 371-9925. A

**Accordion**, full size, \$150. L.A., 277-2549. A

**Camera**, Rolleiflex, f/2.8 2 1/4"x2 1/4", flash-flex capacitor, flashgun bayonet, flash bulbs, lens shade filter holder, 6 filters, 1 holder, fitted case, G.E. light meter, leather carry-all bag, \$85. San Pedro, FR 2-6585. A

**Contour Chair**, \$10. Hawthorne, 676-7109. A

**Diving equipment**, full wet suit, size 40, depth gage, compass, tank & harness, \$85. Manhattan Bch., FR 9-6931. A

**Infant seat**, \$1. Inglewood, 674-6395. A

**Auto**, r/h, p/b, p/s, auto. trans., never o/hauled, \$500. Hawthorne, OS 9-7123. A

**Pontiac**, 1963, Bonneville convt., fact. air, full power, AM-FM, \$1750. Hawthorne, 675-5765. A

**House**, 4-bdrm., fam. room, 2 1/2 baths, 1 acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

**Pontiac**, 1966, Tempest, 8-cyl., auto. trans., r/h, \$500 & take over \$16 weekly pymnts. Lawndale, 370-3821. A

**Hi-Fi**, table model radio-phonograph, \$39. Hawthorne, 676-0418. A

**Wet Suit**, complete, size 5'8", 145 lbs., \$35. Redondo Bch., 371-0323. A

**Yamaha**, 1963, 250cc, YDS2, dirt racer, new pistons & lower end, \$350. Torrance, FR 5-2169. A

**Redwood Fencing**, w/door, approx. 100', 5' high, \$15. San Pedro, TE 3-2512. A

**Datsun** station wagon, 1965, 4-dr., 14,000 miles, \$1350. Inglewood, 675-8173. A

**Sailboat**, 10' fiberglass complete w/dacron sail & trailer, \$250. Long Bch., GA 7-4197. A

**Guitar**, Gibson & Les Paul & bass amp., 1964, \$300. Lawndale, 370-9440. A

**House**, 3-bdrm., bltins, bltin TV/Hi-Fi area, raised fireplace, 500 sq. ft. playrm.-workshop, 2 1/2 car gar., fruit trees, walking dist. to shops, 10% dn., \$25,000. Alhambra, AT 4-5698. A

**Pin Ball Machine**, fully automatic, full size Shindig, operated by coin or auto. switch, \$60. Torrance, 375-6467. A

**Extension Table**, solid maple, w/leaves & pads, \$40. P.V. Pen., FR 7-5408. A

**Crib & Mattress**, wood, retractable sides, \$5. Torrance, 325-0039. A

**Couch**, 8', tweed, provincial style, \$45. Torrance, 326-1997. A

**Marker Generator**, Simpson, oscilloscope & sweep frequency oscillator, all combined into model Genoscope, accurate to .05%, \$150. Buena Pk., UN 3-2769. A

**Coat**, mink, full length, autumn haze, 10 yrs. old, 9 yrs. in cold storage, appraised at \$700, \$500. P.V. Pen., FR 8-1863. A

**Cemetery Plots**, 2, Inglewood, Greenlawn section, adjoining, \$350 ea. Hawthorne, OS 6-8842. A

**Vacation Trailer**, special collapsible design, sleep 4, lightweight, welded all steel frame & sides, 6'x10' size, Aerol alum. wheels, hitch & 4 polyfoam mattresses, \$125. Inglewood, 757-2955. A

**Refrigerator-Freezer**, Admiral, \$15. Torrance, FR 8-0500. A

**Rifle**, M-1 Winchester, \$75. Anaheim, 714-828-5759. A

**Bedspreads**, hand crochet, \$35. Box 1702. A

**For Sale**

**Chevrolet**, 1950 convt., \$75. Box 1703. A

**House**, 7 yrs. old, 3-bdrm., 6' blk. wall, 1/4 blk. to grade school, \$1697 dn. to old F.H.A. \$16,790 bal. Lakewood, 865-8009. A

**Home**, 1 yr. old, fully landscaped, 5-bdrm., family rm., 1/2-acre horse lot, \$3500 dn., balance at 6 1/4% interest pymnts. of \$295 mo., \$49,750. Box 1704. A

**Malibu**, 1965, s.s., 327 engine, 10,000 miles, \$2400. Hawthorne, 675-1987. A

**Supercharger**, Judson, for 1963 VW, all parts & instructions, \$185. Lomita, 326-0221. A

**Volkswagen**, 1964, radio w/rear speaker, new tires, new Porsche clutch, eng. trunk lock, \$1350. Redondo Bch., 375-9648. A

**Jeep** station wagon, 2-wheel drive with o/drive, 1952 model, rbilt. eng., 400 miles, rebilt. trans., rebushed front end, \$250. Box 1705. A

**Baby Furniture**, crib, mattress, mesh playpen, stroller, car seat, hi-chair, jumper, infant seat, \$50. Manhattan Bch., FR 4-4780. A

**Home**, 5-bdrm., 3 1/2 bath, on view lot, convenient to Nor. Anaheim, \$77,000. W. Covina, 339-8008. A

**Ford**, 1965, Galaxie 500 convt., low mileage, \$2200. L.A., PL 6-2587. A

**Volkswagen**, 1600 TL fastback, 290 miles, \$2150. Anaheim, 714-828-3718. A

**Corvair**, 1961, good mechanical cond., new tires, \$350. Box 1706. A

**Chevrolet**, 1962, Impala ss convt., good tires & eng., \$1100. Torrance, 375-0165. A

**Honda**, CB 160, new tires, chain & battery, Barnett clutch, \$375. P.V. Ests., 377-2065. A

**Mercury**, 1951, o/drive, rebilt. eng. & carb., \$99. La Mirada, WH 1-5549. A

**Motorcycle**, 1965, Harley Davidson M-50, 50cc, 2700 miles, orig. owner, \$150. Culver City, 398-3949. A

**Cemetery Lot**, single, Parkview, Inglewood Park, \$550. Torrance, TE 5-2128. A

**Movie Camera**, Kodak 8mm, light bar & case, \$25. Fullerton, 525-7685. A

**House**, 3-bdrm., 1 1/2 bath, den w/fireplace, newly painted, dtch. dble. garage, sprinklers, 2 blocks to elem. school, low dn. pymt., \$26,000. Inglewood OS 5-5592. A

**Wanted to Buy**

**Volkswagen**, sedan, 1963 or older, good cond. Torrance, DA 3-2144. B

**Power Edger**. Inglewood, 679-9891. B

**Luggage** in good condition, man or woman's at least 3 pieces. Box 1707. B

**Honda**, 50cc, take over payments. Torrance, DA 4-8663. B

**Trail Bike**, in good condition. La Mirada, 714-521-1516. B

**FREE (To Be Given Away)**

**Puppies**, all black, part cocker spaniel & poodle, female. Lawndale, OS 5-9695. D

**Kittens**, 4, born July 13, black, grey & calico. Torrance, 830-2380. D

**Rentals Offered**

**Apt**, 2-bdrm., bltins, thermo heat, garb. disp., child's play area, carport, newly dec., prefer 2 small children, trash & water free, \$100. Torrance, 320-2827. E

**Apt**, 1-bdrm. unfurn., f/place, 1/2 block to ocean, stove & ref. incl., closed gar., adults, \$135. Redondo Bch., FR 8-7905. E

**Vacation Cottages**, Idyllwild, 1 & 2 bdms., secluded, stream, patios, \$20-\$35 w/ends, \$45-\$65 wk. L.A., PL 4-5288. E

**Apt**, 1-bdrm., furn., mod., walking dist. to Northrop, \$90. Hawthorne, OS 6-4734. E

**Apt**, 1-bdrm., bltin stove, closed gar., laundry facil., \$89. Torrance, 328-6955. E

**Apt**, 2-bdrm., 2-bath, priv. balcony, d/wash., air cond., sound proof, fenced yrd., subter. gar., \$155 mo. Inglewood, FR 5-0867. E

**Apt**, 1-bdrm., bltins., disp., furn., \$115; unfurn., \$100. Hawthorne, 675-9540, 675-9535. E

**Apt**, 2 bdrm., 2 blks. from Norair, water, trash pd., bltins, disp., laundry facil., \$115. Hawthorne, 675-3771 or 675-8388. E

**Apt**, 1-bdrm., unfurn./furn., bltins., air-cond., 20 min. to Norair, \$95/\$105. Mar Vista, 391-7781. E

**House**, 2-bdrm., furn., alone on lot, adults, no pets, avail. Sept. 15, \$97.50. Inglewood, 677-4347. E

**Cabin**, Big Bear Lake, mod., sleeps 7 to 9, \$18 w/end; \$50 week. Bellflower, TO 7-0662. E

**Unit**, 2-bdrm., on waterfront, Huntington Harbor, 46' boat slip, gar., year lease, \$300. Orange, 714-637-8648. E

**Vacation Cabins**, Lake Gregory & Crestline, \$25 w/ends, \$60 wk. Venice, EX 1-2040. E

**Roommate** to share 2-bdrm. bachelor apt., lge. furn., swimming pool, 3 1/2 blocks from Nortronics Hawthorne, \$70 mo. Gardena, 321-0928. E

**Cabin**, Green Valley Lake, \$35 w/end, \$60 wk. Torrance, 320-2002. E

**Apt**, 1-bdrm., pool, bltins, \$95. Redondo Bch., 376-2117. E

**House**, furn., 2-bdrm. & den, 1 1/4 bath, 2-car gar., near freeways, \$225 mo. Gardena, 329-6753. E

**Personals**

**My Son & I** wish to thank each & everyone at Northrop for the flowers, cards, donations to various charities & personal letters in my husband's memory. We thank you. MRS. CHARLES BRADFORD. L

**We wish** to express our thanks & sincere appreciation to our many friends at Northrop for their kindness & remembrances during our hospital stay & recovery period from our auto accident. Also, thanks to NRC for the beautiful chrysanthemums & to the Gem & Mineral Society for the lovely planter. VARNEY BANCROFT & FAMILY. L

NOW, WHO COULD THIS BE?



Farmer Gates has a word with The Drunkard's daughter, Julia, in musical version of the play, "The Drunkard," now featured at the Golden Hull Restaurant-Theatre in Redondo Beach. Julia is portrayed by Joanie Cahn, talented daughter of Norair Engineer Mickey Cahn. She helped her father, who is an accomplished musician himself, land role as Farmer Gates. "Mad Agnes" (at left) is not a Northrop employee.

From Clerk Typist to Student In Greece in a Week's Time

Laurie Warner is a clerk typist at Northrop Norair this summer, but in less than a week she'll be a college student in Europe.



Miss Warner school year.

The girls will enroll on September 16 at Pierce College, a small English-language school in Athens.

For the past two years, Miss Warner attended Lewis and Clark College in Portland, Oregon, and it was her performance there which made the European trip possible.

"My parents told me they'd

let me go to school any place in the world as long as I kept my grades up," Miss Warner said, "and I have a B average." Her father is Don Warner, Norair manager of Research and Development.

Miss Warner and one of the girls will stop in Glasgow, Scotland, where they'll visit friends of the other girl. Then, in Copenhagen, Denmark, they'll visit Greg Larnes, who was an exchange student at Palos Verdes High School last year. While in the United States, he lived in the Warner home and went to school with Miss Warner's brother.

"We plan to travel through Europe during the school year," Miss Warner said. "We won't have a car, but train travel in Europe is inexpensive. I especially want to see Switzerland, Austria and Spain."

Students at Pierce College have two-week vacations both at Christmas and Easter. That's when the girls plan to do most of their European sightseeing.

Miss Warner spent the summer working in several positions, the most recent as secretary in Ken Yost's area. He is chief of Technical Data Administration.

Two Tooling Men Pocket Cash For Cost Cutting Ideas

Two members of the Northrop Norair Tool Design and Fabrication function recently converted good ideas into ready cash through the Suggestion Award Plan, receiving their outstanding payments on the same day.

For Glenn S. Crayk the payment was \$480. Marvin F. Kratz received \$471.

Mr. Crayk proposed removable leader pins be used for Verson dies. This enabled the blanking of larger sheets of raw material and afforded greater versatility in the nesting or locating of parts on the materials.

Mr. Kratz came up with a better method of pouring epoxy in the making of master tooling.

For Sale or Trade	
Trailer, 18', w/refrig. & stove, \$150 or trade for hauling trailer. Hawthorne, 644-1205. L	
House, 4-bdrm., fam. rm., 2 baths, fence & landscaped yd., 1 mile to Research Park, 5½% loan, \$39,990 or trade for house from Inglewood area. P.V., 377-5172. M	
Going my way	
Rides Wanted	
7:24 a.m. — 4:06 p.m.	
Anaheim & Figueroa via Harbor Fwy. Tom Henrich, Mariposa, ext. 2425, TE 5-9070. 1	
7 a.m. — 3:42 p.m.	
Chapman St. or near City of Orange, Orange. Larry Slininger, Norair, ext. 2105, 2106. 2	
Slauson & Atlantic, Maywood. Velma Porter, Norair, ext. 1284, LU 2-1079. 12	
8 a.m. — 4:42 p.m.	
Acacia Ave. & Broadway, Hawthorne. E. M. Martin, Norair, ext. 1611, 679-4211. 5	
Diamond Bar to Anaheim, Diamond Bar. Craig E. Wilson, Nor. Anaheim, ext. 1195, 595-7740. 2	
Vicinity of Garden Grove, Garden Grove. Wm. Woodroof, Norair, ext. 1715, 530-3242. 15	
Golden West & San Diego Fwy., Huntington Beach. Dennis Talbott, NSL, ext. 1104, 842-7052. 15	
Rides Offered	
7 a.m. — 3:42 p.m.	
Slauson & Atlantic, Maywood. Velma Porter, Norair, ext. 1284, LU 2-1079. 12	
8 a.m. — 4:42 p.m.	
Golden West & San Diego Fwy., Huntington Beach. Dennis Talbott, NSL, ext. 1104, 842-7052. 15	
Vicinity of Garden Grove, Garden Grove. Wm. Woodroof, Norair, ext. 1715, 530-3242. 15	





IN THIS CORNER—Champs of Los Angeles County major league softball are the Nortronics Hawthorne Hawks which included (rear row, from left): Dick Wood, Fred Seale, Frank Wurga, Carroll Hicks, Wayne Maples, and John Lavender.

Front row: Maury Shulman, Larry Beuder, Larry Beuder jr., Bill McNair, Frank Kawaguchi, and Ron Gregory. Games were played at Alondra Park in Lawndale.

## POLARIS: A Decade of Northrop Support

(Continued from page 1)

ly classified into three major groups or classes — the 598, 608 and 616.

For the class 598 submarines Nortronics developed a DATICO Type "C" automatic checkout system to constantly monitor systems and components within the Polaris weapon system.

The Northrop Mark 3 MTRE (missile test and readiness equipment) was later developed for the 598 and 608 class submarines. Mark 3 systems were used to replace initial Type "C" units in 598 class submarines.

A new and advanced solid state checkout system, the Mark 7 MTRE, was developed utilizing a modular structure that could be mounted on vertically suspended doors aboard Class 616 submarines.

In addition, Nortronics has developed and fabricated checkout systems for all maintenance levels of the Polaris missile program (factory, shipyard and tenders); automatic module test sets to verify the functional adequacy of MTRE drawers and subassemblies

to be processed through repair cycles; field module test sets for operational go/no go testing and fault isolation aboard submarines, tenders and shore installations; instructor consoles, simulator-trainers and other devices for crew and

### MANAGEMENT

(Continued from page 1)

iel; Frank S. Perego, Marketing; and W. E. Woolwine, F-5/T-38 Program Management.

"Northrop has, in the fiscal year just ended, reported the highest backlog in its history," Mr. Jones said in the announcement. "All segments of our company have contributed to this growth. Continuation of this rate of growth into the future will demand the utmost effort of all of us and the strongest possible deployment of our total management resources."

Mr. Horner joined Northrop in July 1960, after serving for more than a year as associate administrator of the National Aeronautics and Space Administration.

He was responsible for the operational management of the research and development program for NASA.

Before joining NASA, he spent more than three years as assistant secretary of the Air Force, specializing in research and development.

Mr. Horner received a bachelor of science degree in aeronautical engineering from the University of Minnesota in 1940. He then joined the United States Army Air Corps as a second lieutenant.

In 1949, he left the Air Force as a colonel.

### Anaheim Gun Club Schedules Shoot

The NRC Gun Club at Anaheim will hold a regular shoot at 9 a.m. September 10 at the Silverado Sportsman's Range and a monthly meeting at 7:30 p.m. September 6 at NRC Clubhouse, Fullerton.

Events scheduled for the shoot will be handicapped big bore, handicapped small bore, handicapped pistol, plus DCM small bore and pistol shoots.

Prizes for attendance drawings and shooting awards for the last competition will be presented at the regular meeting.

maintenance personnel training.

Nortronics operates for the Navy a unique Polaris repair depot where components and systems are cycled for repair and rework to enhance the latest advancements in the art.

Nortronics operates a logistics and inventory management program for the Polaris fleet, provides field engineering and works to produce and update all types of handbooks and instruction manuals.

In short, each Polaris submarine that slips silently below the sea, the submarine tenders that sail the oceans in support of these submarines and the shorebased installations that service both rely upon Northrop-produced products and services.

And Northrop Nortronics is currently at work on similar services and equipment for use in the United Kingdom Polaris Program.

In the future, the Polaris submarine fleet and supporting facilities will be refitted to accommodate the new Poseidon missile which will have a greater accuracy and flexibility than the current Polaris series.

Nortronics has received a contract to develop and build automatic checkout equipment for use on both land and sea in support of this new weapon system.

### AT HAWTHORNE

## New Facility Casting First Shadows

Northrop Norair's new production facility is casting shadows for the first time as steel framework goes up to form skeleton-like outlines of the new structure.

With the placing of each steel truss, Northrop personnel are getting their first indications of the over-all size of this huge structure.

Here are some figures of general interest:

First, this is not just a building, but a facility, a modern, integrated center for the production of large aircraft structures such as those required on the Boeing 747 program and similar work on other subsonic and supersonic transport programs expected in the future. It will house, under one roof, personnel needed to carry out these programs from Manufacturing, Engineering, Administration, and support groups.

In keeping with its intended use, it will be called the Trans-

### NRC ROUNDUP

## Hawks, Jets Sweep To Softball Titles

The summer softball season has come to an end, and two of Northrop Corporation's four teams have first place trophies to show for their weekly efforts.

The Nortronics Hawks won their third consecutive championship in Los Angeles County Major Industrial League competition, with a record of eight wins, three losses and a tie.

The Norair Jets, in the Los Angeles County Open Industrial League, took their pennant with a 12-2 record.

No Northrop team had a losing record for the 1966 season, as the Ventura team was 5-5, finishing in fourth place in the Thousand Oaks Parks and Recreation League. The Norair Talons, in the same league as the Jets, were third with a 6-6 record.

The Nortronics Hawks had the most difficult competition in the county to contend with each week. Manager Larry Beuder said his pitchers, Fred Seale and Julio Jniguez, were the chief factor in winning the championship for the third straight year.

Infielders included John Lavender, Dick Wood, Wayne Maples, Ron Gregory, Maury Shulman and manager Beuder. The outfielders were Carroll Hicks, Frank Wurga, Bill McNair, Chuck Chamberlain and Frank Kawaguchi. Bat boy was Larry Beuder jr.

The Norair Jets, managed by Mac McConnell, won their title by a three-game margin. The second place team was 9-5. Mr. McConnell's pitching staff included Tom White and Terry Birdsall. The catcher was Chuck Talbot.

The remainder of the squad included Ron Gregory, first base; Ty Goodman, second base; Chuck Sankey, third base; Henry Andrew, shortstop; Mel Overton, coach and utility infielder; and Blanchard Davis, Roby Harris, Chuck Ramsey and Barry Glantz in the outfield.

Jose Ojeda's Talons started quickly, but had personnel shortages in the last few weeks of the season.

Chuck Taylor's Ventura team was in second place for a time, then lost three consecutive key games and slipped into fourth place.

Mr. McConnell, NRC softball commissioner, said he hopes next year to organize an all-Northrop inter-plant league.

### Flag Football Coaches To Organize Tuesday

An organizational meeting for NRC flag football coaches will be held Tuesday in the Northrop Norair Personnel Activities office, Football Commissioner Jerry Naulls has announced.

The meeting will begin at 11:30 a.m.

Schedules will be agreed upon, and player signup sheets will be available, Mr. Naulls said.

Six teams have been organized to date, but more will be added if there are enough players. Each team will carry a 15-man roster.

Eligibility is open to all Northrop Corporation men and to husbands of women employed by Northrop. Flag football is played with seven men. This is the fourth year of flag football at Northrop.

Practice games will begin in mid-September, Mr. Naulls said, and league play will continue until the Christmas Holiday.

Potential players or coaches may obtain further information by contacting Tom White in Personnel Activities, extension 2486, or Mr. Naulls at extension 2184.

Mr. Naulls is the brother of Willie Naulls, former UCLA All-American basketball star, now with the Boston Celtics.

### Bridge Club Plans All Day Team Event

Northrop Bridge Club members at Anaheim are signaling the end of summer vacation in a big way — with an all-day "Team of Four" event opening at 9 a.m. September 10 in the NRC Clubhouse, Fullerton.

With action to continue all day, the players will either break briefly for lunch or have a luncheon catered, as interest warrants. Trophies will be awarded at the end of play.

Entry fee is \$1 per individual. Advance registrations are requested in order to complete arrangements. Contact Personnel Activities for entry forms or NRC Commissioner Jack Kirkeby, ext. 1025.

### Corporate Planner Joins Miller's Staff

A 25-year veteran of the aerospace industry has been named assistant to the manager of the Northrop Nortronics Technical department.

He is W. H. Arata, jr., who transferred to Nortronics from the Corporate Development Planning staff. He has been with Northrop since January 1963.

R. F. Miller, Nortronics vice president and manager of the Technical department, said Mr. Arata's duties will include internal business planning, market analyses and proposal development.

### Sports Car Club Schedules Slalom

Northrop Sports Car Club will stage a Del Camino X Southern California Council of Sports Car Clubs Championship Slalom September 11 at Terminal Island.

Registration will be between 8 a.m. to 3 p.m. with the first run at 8:30 a.m. Entry fees are \$3.50 for singles; \$5.50 for married couples, payable at the site.



# NORTHROP NEWS

NORTHROP NORTRONICS

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Vol. 24, No. 18

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## Vigicon Goes On Display In Europe

Vigicon has made its European debut.

The Northrop Nortronics-built information display system is in Paris this week, being shown to representatives of 11 Free World nations.

Three Nortronics Palos Verdes men accompanied the system to France, where they began showing it on Monday and will continue through Friday.

(Photos on page 6)

Bob Miller, applications engineer; Evan Zelin, equipment engineer; and Jim Ferguson, systems engineer, arrived in Paris on September 2.

After the showing, which is under the direction of the Northrop International offices in Paris, they'll stay to further demonstrate the Vigicon to interested parties.

The trip, the first outside the western hemisphere by a Vigicon system, necessitated special packing and crating by moving men trained in handling electronic equipment.

Every part was packed separately for the long flight, and sensitive electronic instruments were placed aboard shock-absorbing pallets.

Mr. Miller said government representatives from Norway, Denmark, Sweden, the Netherlands, Greece, Turkey and Spain were invited, as well as those from England, France, Germany and Italy.

The showing was arranged through the North Atlantic Treaty Organization (NATO) and the joint European Command (EUCOM).

Following the Paris showing, the Vigicon system will be taken to U.S. Strike Command (USSTRICOM) headquarters near Tampa, Florida, for additional demonstrations.

Vigicon systems utilize data projection equipment to simulate the movement of ships, submarines and aircraft.

Vigicon systems utilize data projection equipment to simulate the movement of ships, submarines and aircraft.

BY MRS. BOB HOLLY

## 'Incredible Feat' Saves Drowning Tot

The wife of a Northrop Nortronics engineering assistant emerged from the Labor Day holocaust of accidental deaths a life-saving heroine despite the fact she is partially disabled.

Mrs. Robert (Clara) Holly, whose husband works at Nortronics Applied Research department in Newbury Park, rescued a drowning two-year-old child from a backyard swimming pool September 4 while visiting friends in Lafayette, California, a few miles northeast of Oakland.

"I can't swim a stroke," Mrs. Holly said. "I can walk short distances, but I lose my balance and fall very easily and then I need help to get up. But when I saw the boy tumble into the pool

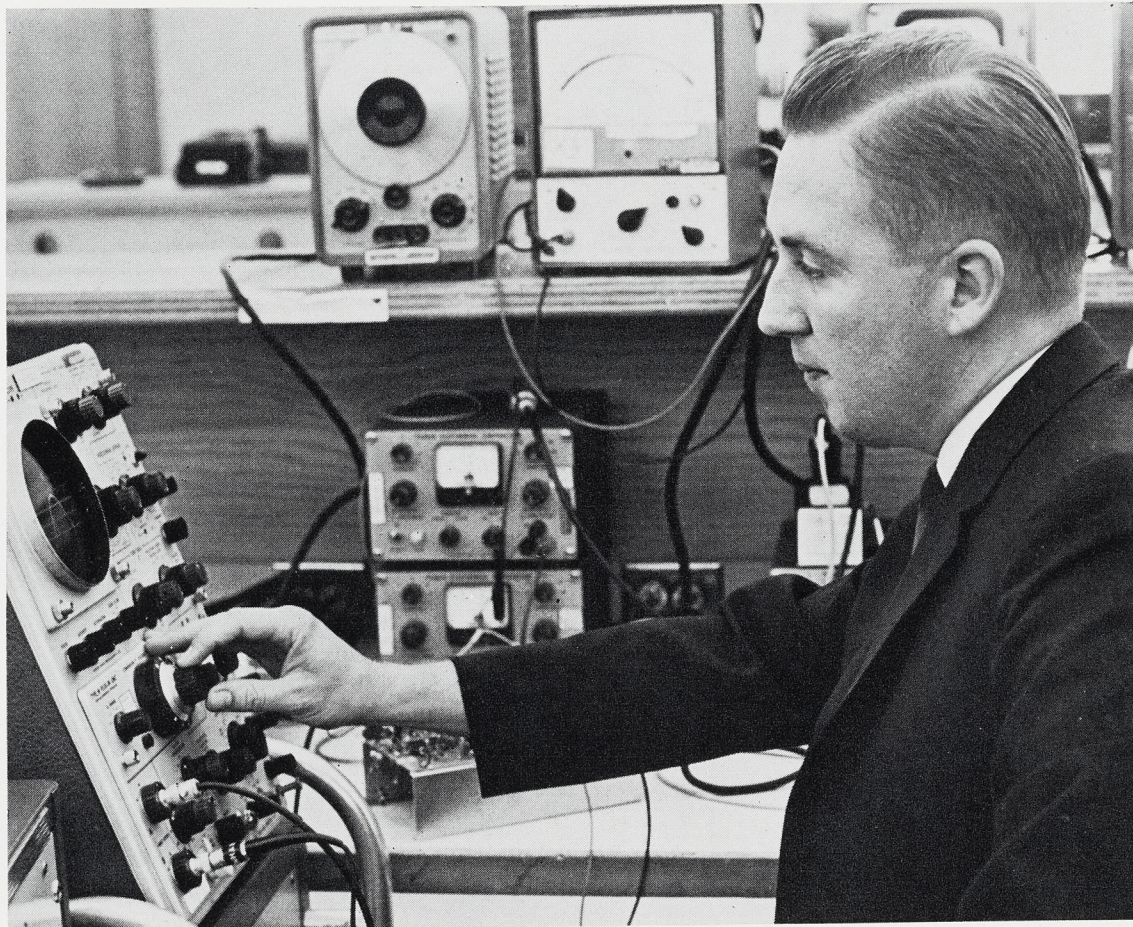
I didn't give falling a thought.

"I walked toward him, supporting myself against the wall at the side of the pool. After reaching the far end of the pool, I lay on my stomach on the concrete apron and tried to reach him.

"He was just out of reach under the water, but suddenly he rolled over and his arms came up. I grabbed one of his hands, pulled his head out of the water and called for help. Others came running from the house and pulled the boy out. He was all right but crying."

The boy was Paul Cohn, son of Stephen Cohn of Martinez, California, who, like the Hollys, was visiting the home of Mr. and

## TAKING A PULSE



Northrop Nortronics engineer Bob Werth tests pulse analyzer (partially obscured by arm), a sensor which he developed for use in DATICO family of automatic test equipment. The analyzer is used to evaluate operational readiness of systems which utilize electronic pulses—such as radars. Pulse analysis is conventionally a manual

operation, subject to operator interpretation. Nortronics developed the device to be compatible with real-time monitoring capability of its DATICO systems, which presently are being adapted to a new class of destroyers and the Poseidon generation of submarine-launched missiles.

(Photo by Bill Cox)

## 11TH ANNUAL AID, NORAIID CAMPAIGN DUE IN OCTOBER

The 11th annual opportunity for Northrop personnel to participate in the AID-United Givers and NORAIID drive, which supports Southern California charitable organizations, will take place next month.

October 3-10 is "Designation and Sign-Up Time" for all employees who have been giving through this unique program, or who would like to begin doing so this year, according to Welfare Coordinator Marie Tully.

The program is simple, inexpensive. (See CHARITY, page 6)

## Apollo Range Ships Spares Contract Won by Needham

A contract in excess of \$650,000 for shipboard spares to support marine star tracking systems used on Apollo moon program range ships has been awarded to the Needham department of Northrop Nortronics.

The star trackers, produced by Northrop under a previous contract, are used to monitor and update shipboard inertial navigation systems (SINS) aboard the five Apollo tracking ships. Both awards were made by the Sperry

Gyroscope Company, Great Neck, New York, prime contractor for the SINS.

By providing highly accurate celestial fixes to compare against SINS position and heading references, the star tracking systems make it possible to detect and correct navigation errors which might accumulate through gyro and accelerometer drift. They can accurately track stars in the daytime as well as at night.

## New Facility To Be Opened Near 'Big A'

Northrop Nortronics will open a new facility in Anaheim, near Angel Stadium, to provide new manufacturing capacity, it was announced this month by Frank Lynch, Division vice president and manager of Operations.

The new facility on South Page Court will give Nortronics an additional production area of approximately 200,000 square feet.

Mr. Lynch said the expansion is necessary to keep pace with the division's continued growth in support of manufacturing programs throughout Northrop Corporation.

The new facility will feature two buildings and parking area on almost 10 acres.

Nortronics will occupy an existing building at 1541 South Page Court, on 4.263 acres, with 83,164 square feet of production space. The lessor is Malibu Shore Properties, Inc., of Los Angeles.

A second building is now under construction at 1543 South Page Court, and will be leased from Incentive Aid Foundation of Los Angeles. The building will be completed by December 1 and include 100,000 square feet of manufacturing space. The property, which includes 5.5 acres, also will have parking areas.

Northrop was the first major aerospace corporation to open a facility in Orange County. Currently the Orangethorpe complex occupies 54 acres, with more than 625,000 square feet of manufacturing and office space. The payroll today is more than \$20 million.

Mr. Lynch said that some 1900 employees currently work at Nortronics-Anaheim, compared to last

(See BUILDING, page 6)

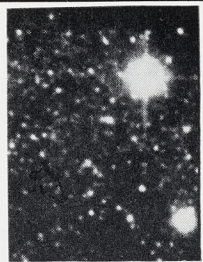


"THERE I WAS AT 1000 FEET"—Mrs. Jean Roberts was taking helicopter ride (a prize) when her name was drawn for all-expense trip for two to Las Vegas, grand prize at the NRC picnic. She came down to earth long enough for Joe Kalina (right) and Dick Teel, NRC president and vice president respectively at Nortronics Hawthorne, to present award. (Story and other photos page 4.)



## AD ASTRA PER ASPERA

## NASA Announces Experiments For Mariner Mars Flight in 1969



Two television cameras, an infrared spectrometer and other data-collecting equipment, will be installed on the Mariner Mars spacecraft scheduled for launch in 1969, NASA officials have announced.

The cameras and spectrometer will be accompanied by an infrared radiometer, an ultraviolet spectrometer, a celestial mechanics system and an S-Band occultation system.



Mr. Munk

The equipment was selected by NASA to increase knowledge of the Martian atmosphere and terrain, and to determine its orbit more precisely.

The data will be used in planning for landing instrumented spacecraft on the planet, NASA officials said.

Northrop Space Laboratories has a contract to design, develop, build and test the engineering mechanics subsystems for the Mariner Mars '69, under direction of the Jet Propulsion Laboratory.

Northrop Space Laboratories has a contract to design, develop, build and test the engineering mechanics subsystems for the Mariner Mars '69, under direction of the Jet Propulsion Laboratory.

The contract includes the fabrication of parts of the structure, mechanisms, flight electrical cabling and the temperature control system.

Both phases of the contract, designated Phase I and Phase II, began on August 3. Phase I includes preliminary design and detail design. Phase II consists of fabrication, assembly and testing.

Robert Munk is program manager and Ralph Hakes is assistant program manager.

The Mariner will be launched by an Atlas-Centaur from Cape Kennedy sometime between February and mid-April in 1969.

It will reach Mars in late August or early September, and is expected to fly past the planet at an altitude of about 2000 miles.

When the Mariner passes Mars, two television cameras will take both high and low-resolution pictures of the surface.

The pictures will be used to provide knowledge of the general exterior features of the planet, including geologic history, such as evidence of change in the shape of craters.

Data gained from the infrared spectrometer is expected to provide information on atmospheric composition, such as carbon dioxide, hydrogen and oxygen, as well as surface composition, temperatures and atmospheric photochemistry.

The infrared radiometer will be used to de-

termine the temperatures of individual areas on the surface.

Through use of the celestial mechanics system, investigators hope to improve knowledge of the masses of Mars and the moon, the distance from the earth to the sun, and the precise orbits of earth and Mars.

The S-Band occultation equipment will be used to further information on density, extent and composition of the Martian ionosphere.

### SAE in Los Angeles

Eleven Northrop Corporation men are scheduled to participate next month in the 1966 National Aeronautic and Space Engineering and Manufacturing Meeting, to be held in Los Angeles.

The meeting, sponsored by the Society of Automotive Engineers (SAE), will be held October 3 through 7 in the Statler Hilton Hotel.

One of the meeting's sponsors is Richard E. Horner, Corporate senior vice president-Technical. He's been named sponsor of the Manufacturing Forum Executive Committee.

Jack Mannion, Norair vice president of Manufacturing, is on the Executive Committee.

Also working in the manufacturing forum are Paul Warren, Bernerd Gaiennie, C. Z. Stine, J. G. Louvier and R. E. Clemens.

Mr. Warren, senior manufacturing research engineer, will discuss "Manufacturing Development to Production" at an October 4 meeting.

Mr. Gaiennie, administrator of Manufacturing Research and Development, is planning an October 4 meeting, titled "Organizing for New Manufacturing Techniques."

Mr. Gaiennie also is co-chairman of publicity.

Both Mr. Stine, of Industrial Training, and Mr. Louvier, of Metallurgical Engineering, will be on the panel for "Organizing for New Manufacturing Techniques."

Mr. Clemens, a senior quality control engineer, will be among four men discussing "Product Qualification-Nondestructive Testing," in an October 3 meeting.

All are Norair employees.

Four other Norair men are working on the aeronautic session of the meeting.

C. W. Eyres and S. L. (Pete) Shaw, members of the technical staff of the vice president-Engineering, will be on the Program Planning Committee.

H. K. (Ted) Hanchett, supervisor of AGE Requirements, will be chairman and organizer of the session on Aircraft Ground Support Equipment. With him on the session will be P. L. Williams, senior engineer.

## HEARST CASTLE TRIP PLANNED BY TRAVEL CLUB

Hearst Castle in San Simeon will be the destination of the NRC Travel Club on October 22 and 23.

In addition, the two-day bus trip will feature a two-hour stopover in Solvang, a nearly authentic Danish village north of Santa Barbara.

The group will leave Plant 1 at Norair at 9 a.m., October 22 on an air-conditioned bus. At noon, the group will stop for lunch at Andersen's Split Pea Soup Restaurant in Buellton, near Solvang.

Following lunch and the sight-seeing stopover in Solvang, the trip will continue to Morro Bay, and the Golden Tee Resort Lodge.

The next morning, the group will leave Morro Bay for Hearst Castle. Two tours will be offered: one of the upper floor, called La Casa Grande; the other, of the lower floor, called Enchanted Hill.

The price of the trip is \$19.75 for the upper floor tour, and \$18.75, including the lower floor tour. The cost also includes transportation and a double occupancy room at the Golden Tee Resort Lodge. It does not include meals.

## Mariposa Receives Pony League Award

A "Special Achievement Award," the first ever presented by the North Torrance Pony Baseball League, has been awarded Northrop Norair personnel assigned to the Mariposa facility.

The award honors three years of continued support of the league's activities in the field of junior baseball.

More than 100 Northrop employees contributed to league activities this year. In the past two years, upwards of 50 each year have lent their support.

Steve Kadoich, a Norair Quality Control inspector, was president of the league during the past year and presented the award recently.



One of the largest single rolled steel beams is in place at Plant 3. Northrop Norair's Transport Facility The 60-foot beam, which weighs nearly 30,000 pounds, will divide the building's 45-foot high bay areas.

## Agreement Signed With Hallicrafters

Northrop Corporation and The Hallicrafters Company have signed an agreement for the acquisition by Northrop of substantially all of the assets of Hallicrafters. The signing followed approval by the boards of directors of the two companies of the terms of the acquisition.

Completion of the transaction is contingent upon favorable actions by the shareholders of both companies. It is also subject to approvals by the pertinent government agencies.

## DATE WITH 'THE VOICE'



Mrs. Joan Ririe, the voice of NORVIPS, Northrop Nortronics voice warning system, chats with crew members of USS Roncador. Submariners, such as those on Roncador, will be hearing Mrs. Ririe's voice in the event of a malfunction in any of numerous operating systems on board. Voice warning, which is used extensively on aircraft, is designed to relieve visual fatigue of operators who, in the past, have monitored their craft's operation by watching panels of lights, gauges, and other instruments.

## TRAINING UNDER WAY

# A Chance for Mexican-Americans

Initial aircraft assembly trainees arrived at Northrop Norair last week to begin an on-the-job instruction program through a pioneering venture between the Mexican-American Opportunity Foundation and Northrop.

The men began work on Tuesday, September 6. The Personnel Development and Training group is supervising their progress. After a period of 8 to 12 weeks, the training will conclude, and the men will be assimilated as aircraft assembly personnel.

A contract which hopes to place as many as 24 trainees was arranged between Northrop and the Mexican-American Opportunity Foundation. Foundation officials and three Northrop men—Frank Smith, Roland B. Scott and Frank Macias—were present at the contract signing.

Mr. Smith is Corporate director of Industrial Relations.

Mr. Scott, Norair Community Relations coordinator, and Mr. Macias, a Northrop Space Laboratories biochemist, have served as Foundation directors for two and three years, respectively.

Northrop Corporation has supported the Mexican-American Opportunity Foundation since its inception three years ago, just as it supports the Equal Opportunities Employment Program.

The contract for the on-the-

## KCET Plans New Aerospace Series

Everything from detecting life on Mars to the Sealab II experiment will be discussed this month on "R&D Review," an educational television series on KCET (Channel 28).

Each show will be seen at 9:30 p.m. on Thursdays and at 8:30 p.m. on Saturdays. Dr. Martin Klein will be moderator.

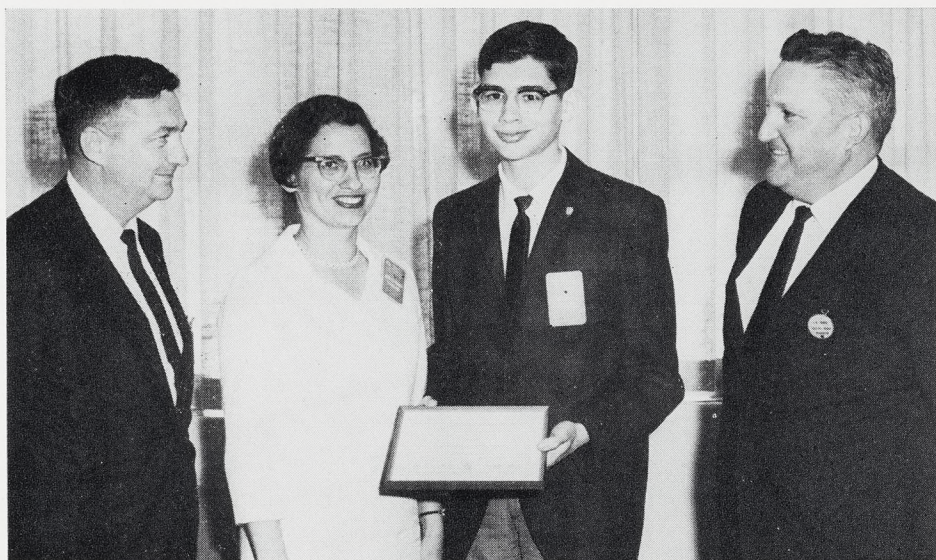
job training program at Northrop was the first issued through the Foundation and was signed during ceremonies opening new Foundation headquarters at 4629 E. Brooklyn Ave., Los Angeles.

The Mexican-American Opportunity Foundation is supported by a \$198,000 grant from the U.S. Department of Labor in addition to help provided by firms and organizations in the area. Dionicio Morales, Foundation executive director, said the Foundation hopes "to open doors to new opportunities for Mexican-Americans in education, training and employment."

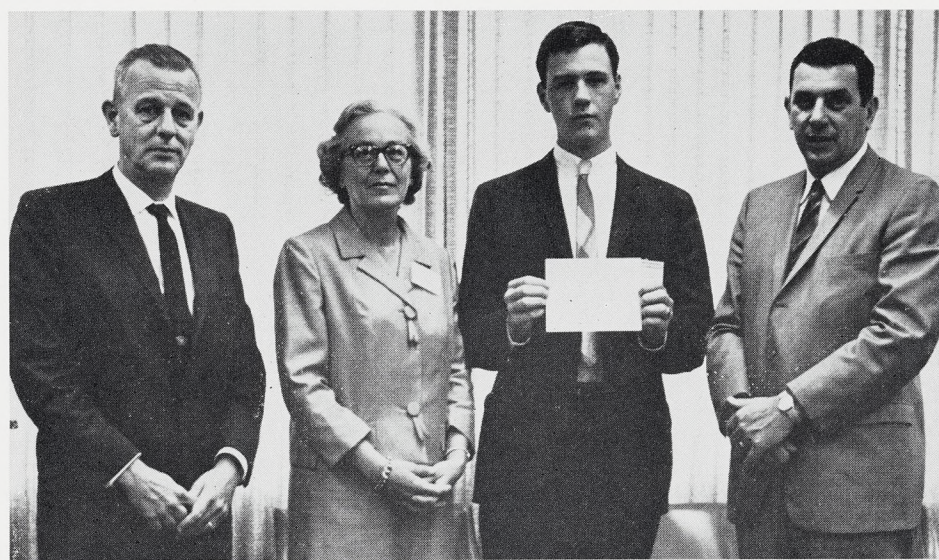
Mr. Morales said training will be established for 400 applicants initially. Most are men who have been displaced from their jobs by technological changes and have not yet had the chance to receive job training.



## NATIONAL MERIT SCHOLARSHIP WINNERS MEET COMPANY EXECUTIVES



Loftin E. Elvey Jr., Mr. and Mrs. Elvey of Nortronics Precision Products department, visit with Les Grohe, Nortronics vice president and PPD manager.



Carson E. Agnew, son of George E. Agnew of Northrop Norair, displays his Merit Scholarship certificate, presented by Welko Gasich, Northrop vice president.



Roger Hudson, son of Mr. & Mrs. Leslie Hudson, receives his National Merit Scholarship from H. E. Riggins, Northrop Ventura vice president and assistant general manager.

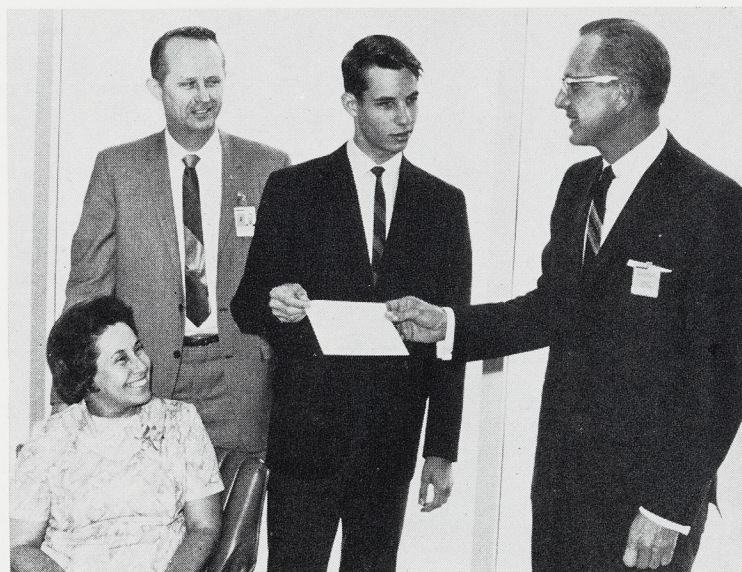
Six sons and two daughters of Northrop employees will be enrolling in colleges throughout the country in the next few weeks as holders of Northrop Corporation Merit Scholarships.

Each of the eight received from \$1000 to \$6000, depending upon need, to cover four years of undergraduate study at any college or university.

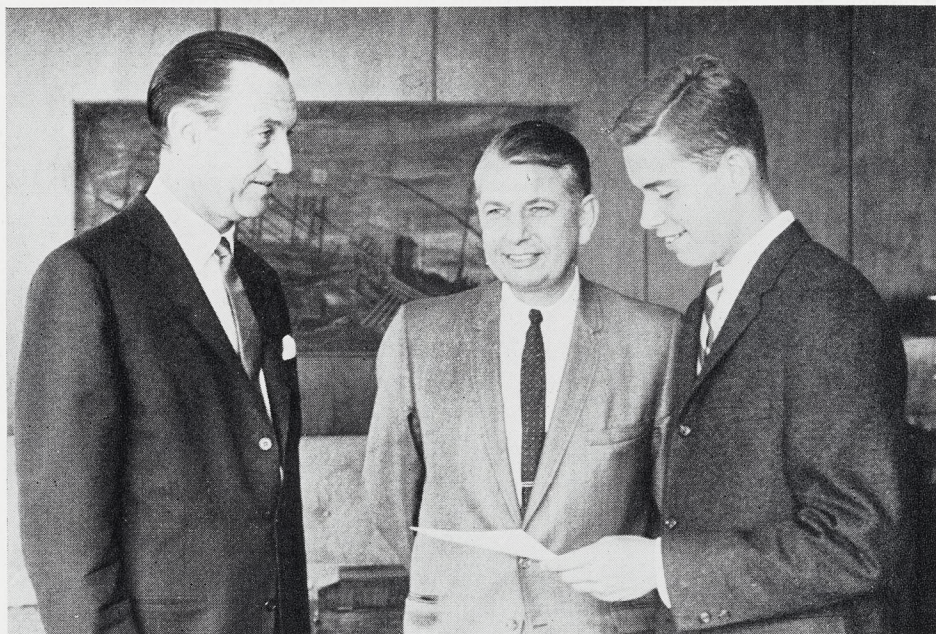
The winners and their parents recently visited Northrop offices, where the students received certification of their scholarship.

Two of the winners are not shown in these pictures, as none were available. One is Marlene Price, daughter of Mr. and Mrs. Richard Price (Page Communications).

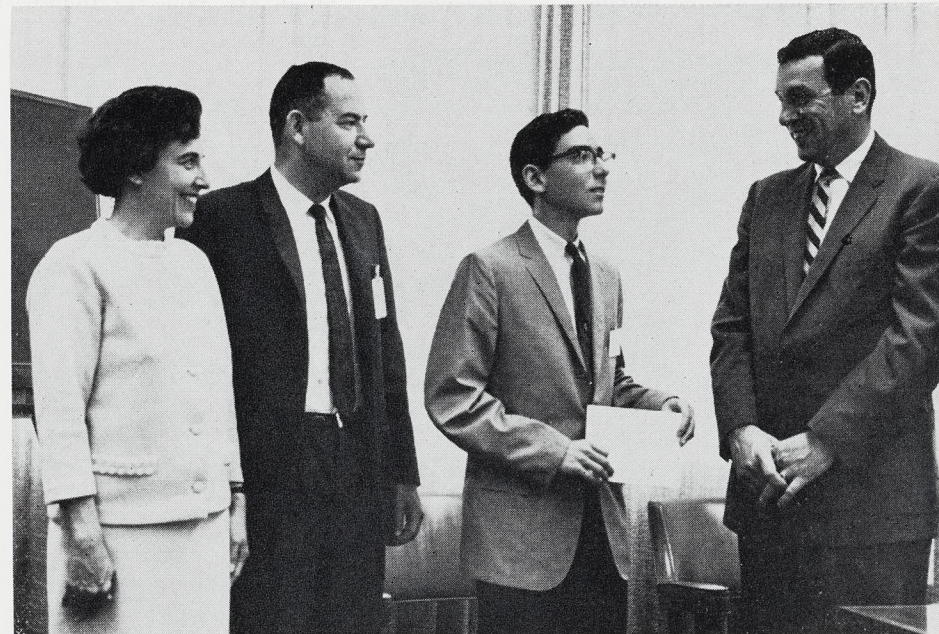
The other is Susan Rothstein, daughter of Dr. and Mrs. Lewis R. Rothstein (Northrop Carolina).



James Chapman, son of Mr. & Mrs. Blair Chapman of Northrop Ventura, receives his certificate from Mr. Riggins.



William Ellet III, son of William Ellet Jr. (center), of Corporate Marketing, visits with Northrop President and Chairman Thomas V. Jones.



Welko Gasich talks with Jerry Gechter, son of Mr. & Mrs. Bernard J. Gechter of Northrop Norair.

### BALLET HONOR WON BY DAUGHTER OF HUNTSVILLE MAN

Eighteen-year-old Cheryl Babcock, daughter of NIKE-X systems engineer Edward S. Babcock, combines her studies with an interest in ballet—and has won honors in both.

Miss Babcock, an education major at the University of Alabama, graduated with honors from Butler High School in Huntsville in June.

Later in the summer, she was the only ballet student in Huntsville to earn the rating of "highly commended" in all portions of the judging.

Mr. Babcock, formerly with Northrop Ventura, joined the Northrop Space Laboratories Huntsville department in 1965.

His son, Edward, 19, is a student at West Point.

## Science Is All That Marches in Unique Reserve Unit

The U.S. Army's 6164th R&D Detachment is a most unusual Army unit—and that's what makes it interesting to its 13 members.

Five of the 13 men hold graduate degrees at the doctorate level; one is a speech pathologist; another, a physician; and another, a research mathematician.



Mr. Carlson is for Research and Development.

Still another is Northrop Corporation's Rich Carlson, a major in the unique detachment.

The "R & D" in the unit's name is for Research and Development,

and the men in the Army Reserve group—all officers—are specialists in some phase of science, mathematics, engineering or related field.

Mr. Carlson, of Corporate Data Processing, has been in the unit for a year and has found it "a lot of fun, and extremely worthwhile."

"We meet twice a month," he said, "and we discuss our specialties."

"At one meeting, an engineer spoke on undersea exploration technological advances. I've discussed data processing, and we've heard from the mathematicians and physicists."

Contributing further to the group's unusual status, there is no summer training, although individuals may volunteer for

two-week scientific seminars.

The 6164th R&D Detachment is one of three such units in the country—others are headquartered in Pasadena and in Maywood—and is one of about 70 in the nation.

The 6164th meets throughout Southern California, and is officially headquartered in Santa Monica. Coordinating the special program is the U.S. Army Department's chief of Research and Development, in Washington, D.C.

Officers in the R&D unit earn points toward retirement at age 60, as do members of other Army Reserve organizations. They qualify for promotion at regular intervals, and can reach the rank of full colo-

nel.

Mr. Carlson served in World War II and the Korean War in communications and logistics, achieving the rank of major.

"We are looking for people who are interested in what we are doing," he said. Prospective members must be Reserve officers in either the Army or National Guard, as the Navy and Air Force have their own R&D organizations.

An applicant must have a science degree, and graduate degrees are preferred. Applications are reviewed by the office of the Army chief of Research and Development.

Additional information may be obtained by calling Mr. Carlson at extension 2458 at Norair.

### R&D REPLACES PT





## 9000 TURN OUT FOR PICNIC; JEAN ROBERTS WINS TOP PRIZE

Mrs. Jean Roberts, a clerk in Nortronics-Hawthorne's Quality Analysis group, was one of about 9000 Northrop employees and guests to attend the annual NRC picnic this year.

But Mrs. Roberts, unlike all the others, was the winner of the drawing, giving her an all-expense-paid trip for two for a week-end in Las Vegas.

"I was on the picnic's helicopter ride when they held the drawing," Mrs. Roberts said, "and I didn't know I had won until the day after the picnic." Mrs. Roberts has been with Nortronics for nearly two years.

In all, Northrop families and their guests ate 6700 hot dogs, 7500 bags of popcorn, 7500 cups of ice cream, 2300 snow cones and 1570 cotton candies, and drank 7500 cups of cola.

The picnic was held Sunday, August 28, at the Los Angeles County Fairgrounds in Pomona. One county fair official told Bill Wareing, NRC president, that it was the largest private picnic he had ever seen at the fairgrounds.

Although the hours were 10 a.m. to 7 p.m., families were still coming in well after 6 p.m., Mr. Wareing said.

Activities included children's rides, helicopter rides, stage entertainment, a model airplane demonstration, and four hours of live music.

Mr. Wareing said present plans call for a "repeat performance" at the County Fairgrounds next year, because of the response this year.



PHOTOS BY DAVE SALDANA





# Classified

Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private business are not accepted. The Northrop News reserves the right to edit or omit ads. Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

## For Sale

**Engagement ring**, full carat, 4-diamond wed. band, interlocking, new, \$175. L.A., 645-5610.

**Exec. Home**, 4-bdrm. inc. lge. master bdrm., 1 1/4 baths, nearly 2100 sq. ft., 2-car gar., lge. fireplace, elec. kitchen w/bltins, cpts., dps., within walking dist. of Northrop, 6 1/2% take over loan avail., \$34,950. Hawthorne, PL 6-9659. A

**Home**, 5-bdrm., 3 1/2 bath, on view lot, convenient to Nor. Anaheim, \$77,000. W. Covina, 339-8008. A

**Couch**, & matching chair, good tweed, 1-yr. old, modern, \$95. Northridge, 360-5092. A

**Movie Camera**, 1965 Keystone Horizon, 8mm, model K-865 sensirion, load-a-matic, 2-spd., elec. dr. w/lite-guard, f/1.8 focusing zoom lens, reflex view finder, pistol grip, \$165. Torrance, 375-4593. A

**House**, 3-bdrm., or 2 & a den, garb. disp., 1 1/4 bath, sprinklers, water softener, 5 min. from Northrop, \$23,995. L.A., 757-3595. A

**House**, 3-bdrm., 2-bath, fenced yd., 4 1/2% G.I. loan, 5 min. from Northrop, bltin vacuum system, \$26,000. Gardena, DA 4-9321. A

**Autoette**, used 1 month, \$600. Torrance, DA 5-7154. A

**Camping Trailer**, 15', 1961 Corsair, eastern blt., insulated, butane wall heater, self-contained, \$550. Torrance, 371-1905. A

**Ford**, 1965, Galaxie 500 convt., low mileage, \$2200. L.A., PL 6-2587. A

**MGA**, 1957 roadster, r/h, new top, good body & interior, 3 new tires & service manual, \$495. Torrance, 375-4846. A

**Corvette Sting Ray**, 1963, fast back, astro wheels, \$2500. Santa Fe Springs, 863-5868. A

**Home**, 3-bdrm., paneled den, lge. all-elec. kitchen, patio, block wall fencing, 4 3/4% loan or refinance, \$20,950. La Mirada, 944-1734. A

**Home**, 3-bdrm., 1 1/4 bath, bltin. appliances, f/pace, ash panel doors, h/wood floors, fenced & landscaped w/sprinklers, 4 1/2% G.I. loan & 6% second avail., \$31,000. P.V., 378-5475. A

**Lot**, 1/2-acre w/3-story unfurn. bldg., in Palos Verdes, \$18,000. Lawndale, 371-3919. A

**House**, 3-bdrm., 2 bath, dble. gar., lge. family rm., 5 yrs. old, 20 minutes to Norair, existing loan of \$18,500 at 5 1/4%, \$145 monthly pymt., owner will take 2nd on part of bal., \$23,950. Wilmington, 830-0740. A

**Baby Carriage**, imported, collapsible, ball-bearing wheels, parking brake, leather slings, \$25. Torrance, 324-5698. A

**Correspondence Course**, NRI course in electronics, principles, practices & maintenance incl. all kits & books, orig. price \$320, \$75. Inglewood, 672-6647. A

**House**, 3-bdrm., indoor patio, 2-car gar., fully landscaped, \$32,500. Torrance, FR 8-1350. A

**Gas Range**, 4-burner w/broiler & storage compartment, \$25. Inglewood, 671-5242. A

**TV**, 19" port., Silvertone, \$45. Santa Monica, EX 4-8641. A

**Stove**, gas, 4-burner w/oven, \$25. West L.A., 277-2549. A

**House**, 4-bdrm., 2-bath, family rm., 1800 sq. ft., all bltin kitchen, cpts., dps., 3/10 mile from Norair, \$27,500. Hawthorne, 679-2307. A

**Studio Couch**, maple, \$30. Hawthorne, OS 6-3410. A

**Honda**, 250 Scrambler, \$500. Inglewood, 676-8982. A

**Mobile Home**, 1963, Viking Imperial, 12'x60', tub & shower, cpts., custom dps., alum. awning, skirting & carport, \$9000. Torrance, 213-370-4641. A

**Honda 50**, 1965, 2, 140 mpg., 1000 miles, \$175 ea. Torrance, 378-8872. A

**Volkswagen**, 1966, 1300, radio, seat belts, \$1600. Torrance, 327-8226. A

**Sofa**, 10' custom-made, 4-cushion, never used, cost \$895, \$400. P.V. Pen., 377-7670. A

**Wing Chair**, large print, \$30. Hawthorne, 675-7965. A

**BSA**, 1957, custom, 650 cc, all chrome, \$625. Gardena, 324-3919. A

**Pups**, thorobred German Shepherd, strong-heart line, silver greys, black & whites, \$50. Malibu, GL 7-2688, GL 7-7621. A

**Austin Healey**, 1959, deluxe, r/h, o/drive, wire wheels, low mileage, \$875. Rolling Hills, 377-8731. A

**Ford**, 1959, 2-dr. sta. wagon, 6-cyl., needs tires, \$135. Torrance, FR 4-9885. A

**Rifle**, custom-bltd., 300 Weatherby Magnum, birds-eye maple stock, \$100. Redondo Bch., 379-4559. A

**Trailer**, 1962 Northwest Coach, 16', sleeps 6, elec. brakes, dual tanks, spare tire, jacks, \$925. Gardena, DA 9-8009. A

**Spare Parts** for Panhard, points, condenser, about \$12 worth of new parts, \$4. Hawthorne, 679-2983. A

**House**, 3-bdrm., single bath, disposal, cpts., fenced, 20 min. to Northrop, \$23,500. Torrance, 370-2794. A

**Dodge Phoenix**, 1960, r/h, auto. trans., p/s, factory air, near new tires, \$450. Fountain Valley, 531-3197. A

## For Sale

**Oldsmobile**, 1961 Holiday coupe, fully equip., low mileage, \$1025. Fullerton, 528-8582. A

**TV**, 21", 1958 Spartan, lobby/table model, blond w/ebony legs, \$40. Torrance, 370-0239. A

**Buick**, 1961 Special, 4-dr. wagon, auto., p/s, near new tires, \$995. Torrance, FA 8-0710. A

**Panel Truck**, 1938 Chevrolet, 1/4-ton, r/blt. eng., trans. & rear end, new paint, tires & brakes, \$600. Torrance, DA 3-1026. A

**Drum Set**, \$50. Torrance, 328-4647. A

**MGTF 1500**, 1955, eng. o/hauled, new top, \$550. Thousand Oaks, 805-495-5531. A

**Golf Clubs**, left-handed, 2 thru 9 irons, 1, 2, 3 woods, \$35. Torrance, 324-9193. A

**Chevrolet**, 1956, 2-dr. sedan, r/h, auto. trans. V-8, \$150. Hawthorne, 644-1096. A

**House**, 3-bdrm., 1 1/4 baths, lge. lot, fruit trees, \$29,500. Manhattan Bch., FR 9-1728. A

**Boat**, 14' Burchcraft, o/board w/lights, steering, & cover, \$100. Torrance, DA 3-7544. A

**Austin Healey Sprite**, 1962, '65 engine, \$750. P. Bend, 377-2921. A

**Sprite Parts**, misc., competition head, SU carburetors, disc brakes & more, \$200 or sell sep. Box 1801. A

**Horse**, young, spirited, mare sorrell, 1/2 thorobred, 1/2 quarter, excellent conformation, \$500. Torrance, 375-6250. A

**T-Bird**, 1963, air cond., p/w, new brakes & tune up, 26,000 miles, \$1725. L.A., OR 2-4828. A

**Shotgun**, Browning 12 ga. auto., 5 3" Magnum, 32" plain barrel, full choke, recoil pad, \$125. L.A., 384-4017. A

**Boat**, 14' Nylox runabout, 35 h.p. Johnson; top, curtains & tonneau, trailer, new wheels, tires, \$640. L.A., GR 9-5653. A

**Travel Trailer**, sleeps 4, stove & ice box, \$150. Gardena, DA 4-6843. A

**Volkswagen**, 1964, radio w/rear speaker, new tires & new Porsche clutch, \$1350. Redondo Bch., 375-9648. A

**Alligators**, stuffed from Guatemala, all sizes, from 2' at \$10 to 4' at \$45. Marina del Rey, 823-2655. A

**Bicycle**, girl's 26", 2-wheel, \$10. Torrance, 835-7887. A

**Chevrolet**, 1964 Malibu SS, 4-spd., p/b, p/s, 2-dr., rear speaker, take over \$69 mo. pymts., \$1300 bal. plus \$200 for equity. Anaheim, 714-635-1686. A

**Baby Furniture**, infant seat, car bed, bassinette, & playpen, \$17. Torrance, 371-1096. A

**Sextant**, James, 4 lens, \$100. Redondo Bch., FR 9-1804. A

**Stove**, 3-burner Coleman, \$15. Fullerton, 714-525-7685. A

**Stamp Collections**, assorted, in 2 albums, \$15. Torrance, 371-9925. A

**Jump Seat-Recliner**, child's, Cosco, \$5. Inglewood, 674-6395. A

**Travel Trailer**, 16 ft. long, 1958 Shasta, many extras, \$750. Torrance, DA 6-5566. A

**Bicycle**, 2 20", \$10 ea. Inglewood, OR 2-2370. A

**Motor**, 1963 Evinrude, 75 h.p., elect. shift, alternator, 2 props, \$625. Hawthorne, 676-7109. A

**Alfa Romeo Spyder**, 1960, new tires & valve job, \$850. San Pedro, 754-0437. A

**Washer**, auto. Westinghouse, model LT-110, \$65. P.V., FR 7-4528. A

**Chevrolet**, 1962, Impala, 4-dr., p/s, p/b, r/h, new tires & brakes, \$1300. Redondo Bch., 370-9795. A

**Sign**, window-type, elec. lighted w/flasher & extra alphabet, cost \$60, \$15. Hawthorne, 676-1018. A

**Motor**, outboard, Johnson 25 h.p., manual start, w/boat controls & 6-gal. gas tank, \$75. Hawthorne, OS 6-5219. A

**Honda**, 1966, 305 Scrambler, 6 wks. old, 650 miles, still under warranty, \$675. P.V. Pen., 377-7555. A

**BSA**, 1965, 1900 miles, \$325. Inglewood, OR 2-7628. A

**Tape Recorder**, SJB chrome, for car, incl. 2 tapes, orig. cost \$70; \$55. Rolling Hills, 833-9747. A

**Dodge Lancer GT**, 1962, r/h, auto. trans., \$9.5. Redondo Bch., 375-1396. A

**Austin Healey**, MK III 3000, 1966, wire wheels, radio, tonneau, top boot & mitten cover, \$2950. Dana Pl., 714-496-1088. A

**Home**, 3-bdrm. & den, spacious playyard & patio, near schools & fwy., panel liv. rm., \$21,900. Gardena, DA 9-2904. A

**Patio Benches**, w/cushions, \$15 ea. Gardena, OS 5-2159. A

**TV**, 21" RCA, blk. table model on base w/wheels, \$50. Rolling Hills Ests., 325-4303. A

**Camera**, Yashica Mat. LM, 2 1/4 x 2 1/4 f/3.5 lens, \$45. Lawndale, 370-0197. A

**Lawnmower**, reel-type, 2 1/2 h.p., \$17.50. Rolling Hills Ests., 375-7038. A

**Honda**, 1963, 250 Scrambler, racing gear, \$425. Long Bch., 429-8837. A

**Sailboat**, 10' fiberglass Elgin w/dacron sail & trailer, \$250. Long Bch., GA 7-4197. A

**Crib & Playpen**, will sell separately, or \$20. Lynwood, 632-2642. A

**Stove**, gas, \$20. Box 1802. A

**Austin Healey**, 1961 Model 3000, soft top, plexiglass top, spokes, radio, o/drive, \$1150. Lakewood, 429-6843. A

**House**, w/Catalina view, 3-bdrm., family rm., dual fireplace, cpts., dps., bltins, near Marymount School, \$36,500. P.V. Pen., 377-4065. A

**Chevrolet**, 1959 Impala, 2-dr., r/h, V-8 4-spd., 4 new tires, \$650. Torrance, 397-3498. A

**TV**, 19" portable, w/stand, cost \$150; \$50. Gardena, 323-6538. A

## For Sale

**Home**, 4-bdrm., 3-bath, lge. cathedral living rm., located 1 mile from all 3 P.V. schools, \$56,000. P.V., 377-6100. A

**House**, 3-bdrm., 1 1/2 bath, den w/fireplace, newly painted, dtch. dble. garage, sprinklers, 2 blocks to elem. school, low down pymt., \$26,000. Inglewood, OS 5-5592. A

**Trailer**, 1962, self-contained, Bambi Air-stream, \$2300. Rolling Hills Ests., 378-4108. A

### Wanted to Buy

**Range**, gas, & dinette set, in good condition. L.A., GR 2-2551. B

**Outboard Motor**, 15 h.p. or less, approx. \$75. Malibu, GL 6-2559. B

**Aquarium**, 20-gallon w/filter, with or without fish. Torrance, 542-1027. B

**Transportation** car in good mechanical condition, will pay to \$150. Redondo Bch., FR 2-8502. B

### FREE (To Be Given Away)

**Kittens**, to good home. Manhattan Bch., 374-4340. D

### Rentals Offered

**Apt**, 1-bdrm., redeck., near Northrop, water, trash pd., furn., \$90; unfurn., \$75. Lawndale, OS 5-9695. E

**Vacation Cabins**, Lake Gregory & Crestline, \$25 w/ends; \$60 wk. Venice, EX 1-2040. E

**Apt**, 2-bdrm., unfurn., 1200 sq. ft., 1 1/2 baths, stall shower, gar. & parkg., 1 mile from Northrop, \$140. Hawthorne, OS 6-5162. E

**Apt**, 2-bdrm., large, newly furn., walking dist. to Norair, \$135 mo. w/lease. Hawthorne, 675-3686. E

**Apt**, 2-bdrm., 1 1/2 bath, cpts. & dps., bltins, near schools & recreation, \$125 unfurn., \$155 furn. Inglewood, 644-2565, 672-1890. E

**Duplex**, front, unfurn., disp., closed gar., 2 lge. bedrooms, water & lawn pd., 5 min. to Norair, \$110 mo. L.A., PL 4-1964. E

**Apt**, 2-bdrm., unfurn., cpts., dps., range, garb. disp., carport, laundry rm., 6 blocks from Norair, no dogs, \$100. Hawthorne, 671-3261. E

**Duplex**, unfurn., 1-bdrm., 5 min. from Northrop, water & trash pd., in Inglewood, \$80 mo. Torrance, TE 5-8687. E

**Unit**, 2-bdrm., on waterfront, Huntington Harbor, 46' boat slip, gar., year lease, \$300. Orange, 714-637-8648. E

**Apt**, 2-bdrm., unfurn., pvt. patio, closed gar., sound cond., hobby shop, hot water & trash pd., \$125 mo. Torrance, FR 5-0867. E

**House**, 3-bdrm., 2 baths, fam. rm., fireplace, cpts., dps., patio, blockwall, atrium, water pd., 3 yrs. old, in Thousand Oaks, \$185 mo. Long Bch., GA 4-9750. E

**Cabin**, Big Bear Lake, mod., sleeps 7 to 9, \$18 w/end; \$50 wk. Bellflower, TO 7-0662. E

**Apt**, 1 & 2-bdrm., unfurn., 1-bdrm., furn., near shopping & schools, \$110 mo. & up. Woodland Hills, 347-5000. E

**Apt**, large 2-bdrm., modern, \$180 mo. Newport Bch., 714-646-7605. E

**Vacation Cottages**, Idyllwild, 1 & 2 bdms., secluded, stream, patios, \$22-\$35 w/ends; \$50-60 wk. L.A., PL 4-5288. E

**Exec. Apt.**, 2 & 3-bdrm., bltins, dps., cpts., closed gar., walking distance of Northrop, \$125-\$225. Hawthorne, OS 6-2501. E

**Apt**, 3-bdrm., next to Century City, all utilities, \$125. W. L.A., 277-0594. E

**Apt**, 1-bdrm., unfurn., close to San Diego Fwy., \$85 mo. L.A., 671-5761. E

**Apt**, unfurn., 1-bdrm. studio & 3-bdrm., 2-bath, 3 blocks from King Harbor, cpts., piped music, bltin vacuum, gar. storage, \$115 mo. Redondo Bch., FR 6-9608. E

**Apt**, 1-bdrm., furn., very pvt., all bltins, pvt. deck, lge. pool, ample sub. parking, near Northrop, \$135 mo. Lawndale, 679-2117, 670-6084. E

### Child Care Wanted

**Child Care** for 2-5 yr. olds, reasonable rates. Gardena, DA 3-0955. G

### Child Care Offered

**Reliable** woman to care for 2 girls, ages 3 & 4, in my home, 8 a.m.-4:30 p.m. Torrance, 323-9598. H

### Personals

**I am** on crutches due to polio & my 2 feet are different sizes. I have pairs of shoes to exchange, free, or will go shopping with you. Left foot, 7 or 7 1/2; right foot, 8 or 8 1/2, no pointed toes, low heels. Inglewood, OR 2-9002. L

**To our wonderful friends** & the Northrop Recreation Club, for your kindness, thoughtfulness, & generosity during our time of sorrow, all we can say is a humble "thank you." DOROTHY HARRIS & FAMILY. L

**My daughter**, Lynn & I wish to express our sincere appreciation for the flowers, cards, donations to the Heart Fund & personal letters in my husband's memory. MRS. A. S. TURNER. L

**Ironing**, by Nancy at home, \$1 hr. Hawthorne, 644-2440. L

**I wish** to express gratitude & sincere appreciation to all my friends at Northrop for their consideration & cards at the recent passing of my brother. L. B. KEY. L

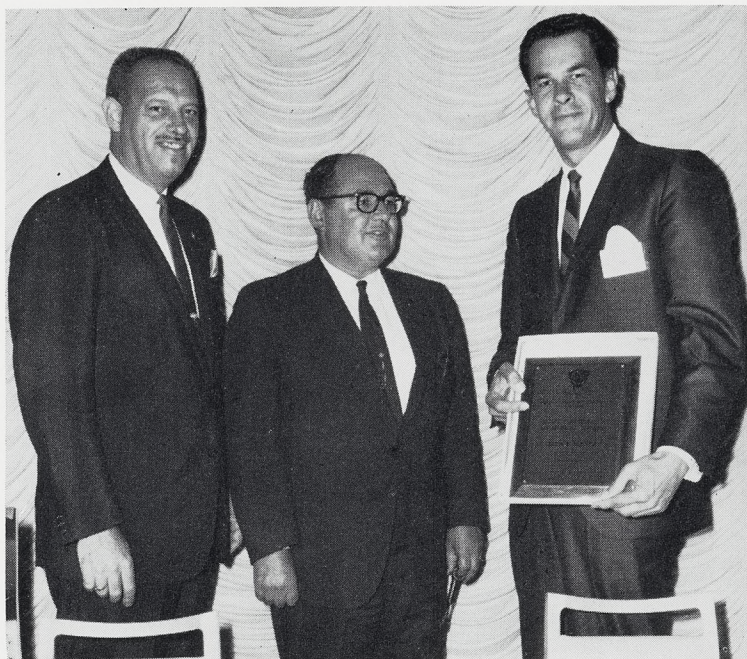
**Garage**, for rent, storage only. L.A., PL 9-4391. L

### For Sale or Trade

**Kitchen Cabinet**, 5-dwr. birch base, dble. kit. sink cab., dble. oven, birch cab., \$200 or trade for 2' shell camper for pickup truck. Torrance, 325-8212. M

**Pick-up**, 1949 Ford, 3/4-ton, '57 eng., 6-cyl., \$175 or trade for welding equip., metal working machinery, compressor, or guns. Hawthorne, OS 9-3476. M

## CARL FAIRBANKS AWARD



Jack Gantz (right) of Northrop Nortronics receives annual Carl Fairbanks Award from the Society of Photo-Optical Instrumentation Engineers for his contributions to the highly successful Airborne Lightweight Optical Tracking System (ALOTS), developed and built at Nortronics Palos Verdes facility. The award is made annually for a significant industry contribution to the advancement of photo-optical instrumentation engineering. Presenting the award are R. P. Murkshe (left), president of SPIE, and Duncan E. McDonald, member of the National Scientific Advisory Board.

## Three Pilots Now Assigned To Lifting Body Program

Two test pilots — an Air Force captain and a former Marine — have been assigned by NASA to the M2-F2 and HL-10 manned lifting body flight test program.

Both wingless lifting body vehicles are built by Northrop Corporation.

The men are Captain Jerauld R. Gentry, an Air Force officer since 1957, and Bruce A. Peterson, a NASA research pilot and engineer since 1960.

They join Milton O. Thompson, chief lifting body research pilot for the NASA Flight Research Center, who piloted the M2-F2 last July. It was the

first flight ever conducted with a manned all-metal lifting body.

Captain Gentry, 31, represents the Air Force Flight Test Center in the manned lifting body program.

He is a 1957 U.S. Naval Academy graduate, and was a F-100 pilot in the Tactical Air Command.

He, his wife, Arden, and two children live in Edwards, near the NASA Flight Research Center.

Mr. Peterson, 33, attended UCLA and California State Polytechnic College at San Luis Obispo. He was graduated in 1960 from Cal Poly. He is a former Marine Corps pilot, and was a NASA project pilot on the Parasev (paraglider research vehicle) program.

Mr. Peterson, a member of the Society of Experimental Test Pilots, lives in Lancaster.

NASA's Office of Advanced Research and Technology is studying the lifting body concept in flight to establish the technological base for design of future manned re-entry vehicles.

In last July's inaugural flight, the M2-F2 was launched at 45,000 feet from beneath the wing of a B-52.

Mr. Thompson, in a series of controlled maneuvers, brought the M2-F2 down to 1200 feet at a descent rate of about two and one-half miles per minute.

Then he flattened out his glide and brought the vehicle to a landing on the Rogers Dry Lake runway at a descent rate of 10 feet per second. The glide took 3 minutes and 37 seconds, from launch to touchdown.

The lifting body obtains aerodynamic stability from its rounded half-cone shape. It offers a means, NASA officials believe, by which pilots returning from space could select a landing site and return to it from a starting point in outer space.

## For Sale or Trade

**House**, 5-room, Spanish stucco on 63 x 130 lot, \$25,000 or trade for residence on same size lot in Fullerton, Brea, Anaheim area. Costa Mesa, OR 1-1254, 714-642-2616. M

**Aircraft**, 1966 Cessna 150 commuter, 290 hrs. T.T., full paint, hv. duty nose gear, child's seat, gyro panel, ILS, 360 channel radio, 3-lite marker beacon, pitot heat, hr. meter, cost \$10,800, \$8200 or trade 1/3 interest & \$600 dn. Hawthorne, FR 8-6951. M

**Acreage**, 20 acres near Willow Springs, in Antelope Valley, East Kern Water Agency Dist., \$495 acre, or take late model car as down payment, bal. w/6% interest. Torrance, FR 8-1026. M

**Acreage**, 10 acres, Calif. land, \$195 acre, \$195 dn., \$19.50 mo. or trade for late model car. No. Hollywood, 983-0437, 875-2873. M

**Router**, Stanley mod. R2-L w/GA-65A base, \$75; other equipment, various prices or trade for 1 kw. lighting generator, pistol/rifle, 22 cal. shotgun, guitar amp w/tremolo or Go Kart. Box 1803. M

## Going my way?

### Rides Wanted

**7:30 a.m. — 4:12 p.m.**

**Sepulveda & Main St.**, Wilmington. Need ride home. Bruce Ball, Mariposa, ext. 4141, TE 4-5191.

**8 a.m. — 4:42 p.m.**

**Rosecrans & Denker**, Gardena. Jodee Parker, Norair, ext. 4720, 323-6538.

**Imperial & Lakewood Blvds.**, Downey. Morris Brown, Norair, ext. 2042, 861-8508.

**3:42 p.m. — 12:12 a.m.**

**Crenshaw & 63rd St.**, Los Angeles. Stan Babinski, Norair, ext. 1825, 751-8487.

**4:42 p.m. — 1:12 a.m.**

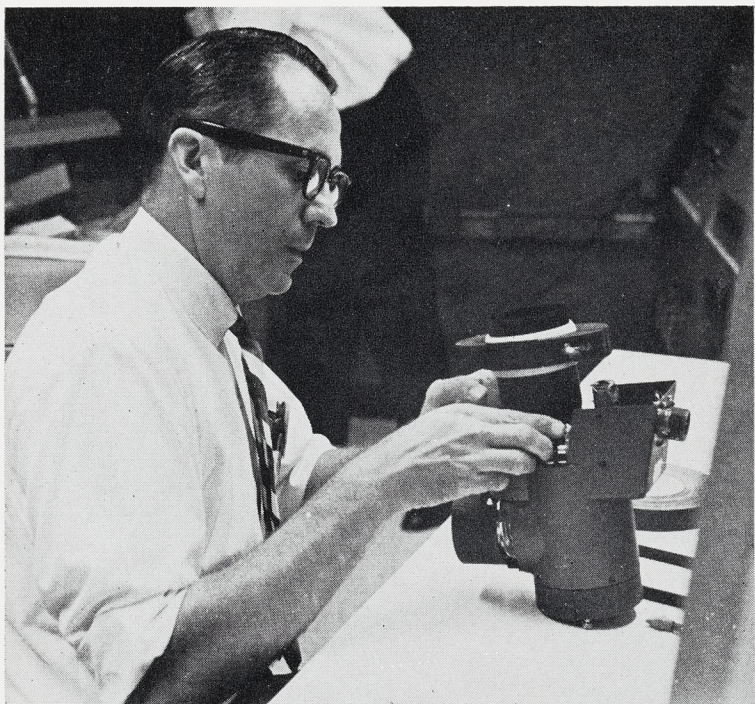
**Chapman Ave. at Harbor or Haster**, Garden Grove. Norma Murray, Norair, exts. 2123, 2470, 714-530-4221.

### Rides Offered

**4:42 p.m. — 1:12 a.m.**

**Chapman Ave. at Harbor or Haster**, Garden Grove. Norma Murray, Norair, exts. 2123, 2470, 714-530-4221.





**DELICATE HANDLING**—Bob Miller, after removing a Vigicon projector from its console, prepares the sensitive optical unit for packing. Each delicate part was individually wrapped for the trip to Paris. The showing is under the direction of the Northrop International offices in Paris. Vigicon utilizes data projection equipment to simulate the movement of ships, submarines and aircraft.



**INTO THE CRATES**—Applications engineer Bob Miller supervises packing of Vigicon units as they are boxed for shipping to Paris. Mr. Miller and two other Nortronics Palos Verdes men are in France, where they're showing the Vigicon to representatives of 11 nations. The display will continue through Friday. (Story on page 1).

## Palos Verdes To Be Host To Art Show

Nortronics Palos Verdes will be the site next month of the Palos Verdes Community Art Association's third annual art show.

The show, expected to attract more than 100 of Southern California's top amateur and professional painters and sculptors, will be held from 11 a.m. to 6 p.m. on October 15 and 16.

The outdoor show will be on the lawns and parking areas of the Palos Verdes facilities, and a dinner will be held on the Administration Building patio.

An estimated 3000 to 4000 persons are expected to attend. More than 3000 attended last year, when the show was held at Portuguese Bend.

The NRC Art Club has been invited to exhibit its work, as have many other clubs in the area. Silk screening, oil and water color painting, metal and stone sculpture, papier mache and jewelry making are among the art forms to be displayed. Many of the works will be for sale.

Danny Gravlin, chief of Facilities for Nortronics Palos Verdes, will be in charge of the grounds operations for Northrop.

Many of the exhibitors and Art Association members were at Palos Verdes yesterday, making final preparations for the show. Mrs. Tom Carvey is association chairman, and Mrs. Allan Mac-Aller is show chairman.

## Archers Bring Home Five Meet Trophies

Three members of the Northrop Nortronics Archery Club, participating in a competition tournament in Inglewood, have come away with a total of five trophies.

Club commissioner Tony Amundson said Jane Mills, Gene Conley and John Pask were the only members to enter the tournament, held at Centinela Park, but each was a winner.

Miss Mills was a double winner, placing first in women's open bow and first in women's bow with sights.

Mr. Conley, of Nortronics Hawthorne, was first in men's bow with sights, and Mr. Pask, also of Nortronics Hawthorne, was second in men's bow with sights and honorable mention in men's open bow.

The group has 28 members from Nortronics and Northrop Norair, Mr. Amundson said, and membership is open to all Northrop personnel.

## Valley NAA Group Judged Second in National Ratings

The San Fernando Valley Chapter of the National Association of Accountants has been judged second highest in the nation in inter-chapter competition.

The Valley Chapter has 21 members from Northrop Corporation, including six from Ventura, seven from Nortronics (including four from NARD), four from Corporate offices, two from Norair and two from Northrop Architectural Systems.

The NAA has more than 200 chapters in 50 states, and 169 of these were eligible to compete. The Valley group was second to San Jose in the point totals.

Points are acquired through acquisition of members, member attendance at monthly technical meetings, submission of technical papers, publication of a monthly newsletter, quality of reports from officers, and special activities, such as plant tours and social events.

For finishing as national runner-up, the group received the Remington Rand Trophy at the NAA convention in New York.

Ward Lancot, Ventura senior accountant, is vice president of the chapter. Dan Cashier, Ventura group administrator of general accounting, is director of programs, and has been named most valuable member.

## CHARITY: More Than \$2 Million Given

(Continued from page 1)

pensive, efficient, very worthwhile and completely voluntary. Here's how it works, according to Mrs. Tully:

"We are all concerned about the less fortunate and the needy, and as responsible citizens we are interested in the general welfare of our respective communities. At the same time, charitable giving can present a real problem when we are not sure of how much, how often and to whom we should contribute.

"There are many, many deserving charities desperately in need of funds, but it is economically impossible for each of us to give to them all—we have to draw the line somewhere.

"The AID and NORAID program offers the best solution to this problem by setting a fair standard of giving for everyone (50 cents for every 100 dollars you earn), by providing an easy method of contributing (through payroll deduction, which you authorize by a single signature) and by affording you these choices:

"1. you may authorize AID to distribute your contribution on an allocated basis to 13 major area health and welfare causes:

"2. you may specify that only one or some of these causes will receive your contribution; or

"3. you may specifically designate your contribution to your own favorite charity or to our

### NORAID AT A GLANCE

	Year Ended July 31, 1966	11 Years Ended July 31, 1966
Contributed by Northrop personnel to AID	\$263,433	\$2,577,295
Transferred from AID to NORAID	\$ 49,107	\$ 614,447
Grants of assistance by NORAID to Northrop personnel		
1. Number of cases	88	1938
2. Total amount granted to recipients	\$ 25,577	\$ 484,706

own in-plant charity, NORAID."

Last year, Northrop personnel pledged a total of \$263,433 through this program, with 67% of all employees giving to AID. Since Northrop joined the AID program as an Employee Chapter in 1955, company employees have contributed over 2½ million dollars to the various charities. This is more than 2% of all the money raised by AID in its 15-year history.

Another record of which Northrop employees can be proud is that their contributions are distributed to more cities in more states than any other AID chapter. Last year, charitable organizations in 154 cities of 16 counties in California, plus those in 94 cities of 24 other states, benefited from these donations. This means that Northrop employees' money was given to the charities in 248 cities in 25 states.

### BUILDING

(Continued from page 1)

year's employment figure of 1200 persons. Between 200 to 300 persons will be employed at the South Page Court Facility. He said the division is actively seeking machinists and production personnel to round out its employment.

Earlier this year, the Division reactivated Building Y-12 as a manufacturing facility. The building, on Orangethorpe Avenue across the street from Y-3, the administration and Engineering building, was formerly devoted exclusively to warehousing and offices.

Under present planning it will continue to provide office area as well as space for assembly of Hawk missile system launchers and loaders and aircraft sub-assemblies.



**SHOOTING WITHOUT GUNS**—Members of the newly formed NRC Archery Club take aim (left) in their weekly practice session at Nortronics Hawthorne. At center, John E. Pask uses a target bow with

sights to take aim. And at right, five members of the club inspect the results of their diligent practice. They are (from left) Erwin Schwartz, Bob Greene, Jane Mills, Mr. Pask and George P. Kranen.



# NORTHROP NEWS

NORTHROP NORTRONICS

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## Growth Cited By Jones as Records Set

Northrop Corporation recorded all-time highs in sales, earnings and backlog for the fiscal year ended July 31, 1966, President Thomas V. Jones announced earlier this month.

Per share earnings, also the highest in the company's history, were \$2.49 on 4,206,500 shares outstanding at July 31, compared with \$2.10 on the 4,126,000 shares outstanding at the end of the previous fiscal year.

Consolidated net income was \$10,474,000 and consolidated sales were \$357,270,000. Last year Northrop earnings amounted to \$8,683,000, and consolidated sales totaled \$339,324,000.

The backlog of firm and programmed work at the year end stood at \$574,000,000, almost double the \$288,000,000 backlog of a year earlier.

"We expect the current year to show significant improvement in volume of sales and continuation in the trend of higher earnings," Mr. Jones stated.

"Our backlog at the end of the year indicates both growth and diversification," Mr. Jones said. "For example, it includes \$67,000,000 in communications systems, \$88,000,000 in electronics, \$178,000,000 in military aircraft, and \$152,000,000 in airframe sections for commercial airliners.

"In this latter area, \$110,000,000 of the backlog represents an initial firm contract from Boeing for design and construction of major fuselage sections for the first 50 of the Model 747 airliners, but none of this will result in significant sales until 1969-70. We expect that our role in the 747 program will, over the long run, exceed \$500,000,000," Mr. Jones said.

Earnings per share for the fourth quarter were 85 cents, compared to 62 cents a year ago. Consolidated net earnings for the fourth quarter were \$3,570,000, compared to \$2,547,000 for the same period last year. Fourth quarter sales were \$112,990,000 compared to \$83,430,000 in 1965.

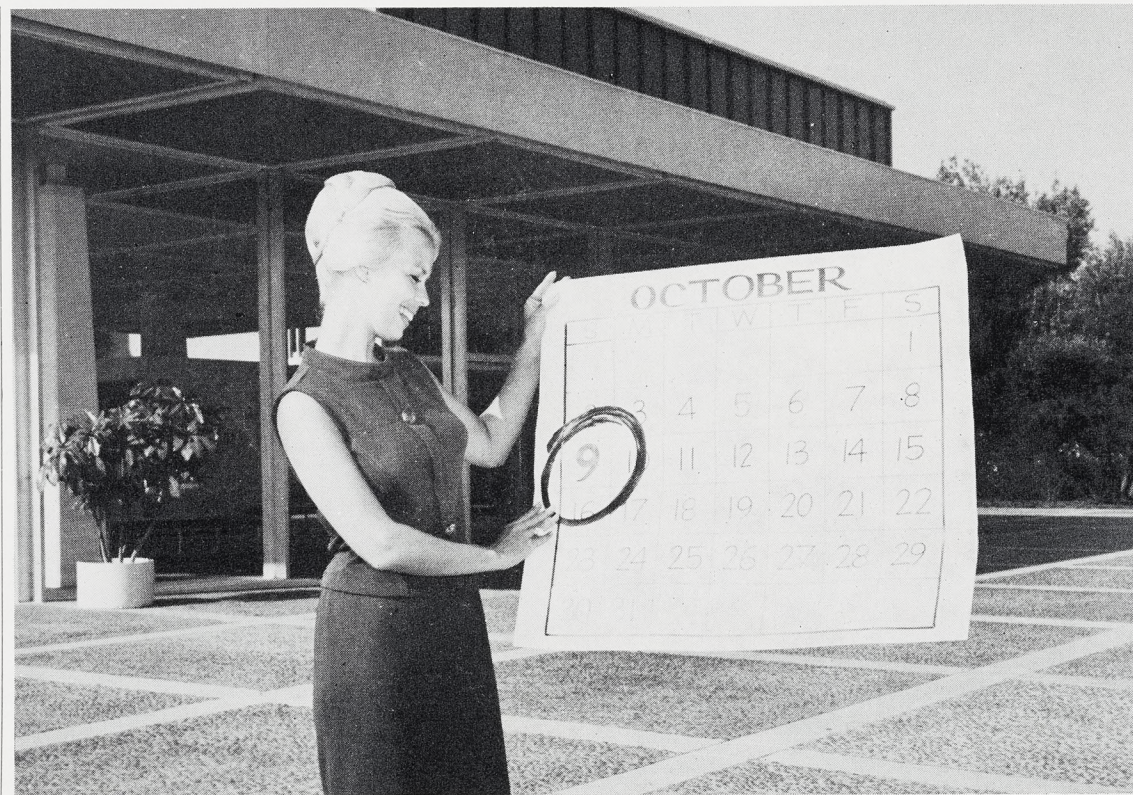
## PROFESSIONAL DEVELOPMENT

### Team Selling Course Charted

Northrop Nortronics is sharpening the skills of its selling teams (which includes management, contract administration, engineering and marketing personnel) with a training and development program designed to insure "professional competence in persons having customer interface responsibilities."

In the first step of the program, 37 men from eight Nortronics facilities and regional offices recently completed a four-day sales training course at the Edgewater Inn in Long Beach.

Described as the first in a series of workshop-lecture sessions, the course was arranged and coordinated by H. V. (Vic) Bray, Division director of Marketing



MESSAGE FOR YOU—A pretty girl (Donna McClymont) with an attractive smile, a king-sized calendar and a circled date are fitting props to remind all Nortronics personnel of their invitation to attend, with their families and

friends, an Open House set for October 9 (1 to 4 p.m.) at Nortronics Anaheim. Many interesting product lines and special displays will be featured at this, the first open house staged in 10 years at Anaheim.

## SHELLY ON FACULTY OF 'FIRST' SEMINAR ON CONTAMINATION

The first educational seminar on contamination control ever staged on the West Coast will convene October 25-27 with a Northrop Nortronics man as a member of a distinguished faculty.

C. P. "Chuck" Shelly, superintendent of Operations at Nortronics Hawthorne, will serve on the faculty and will also deliver the welcoming address in his role as national president of the American Association for Contamination Control.

The AACC and College of Graphic Arts, Rochester Institute of Technology, are co-sponsors with the cooperation of the University of California Extension where the three-day event will be held (in the Downtown Center).

Called "A Management Engineering Approach To The Control of Contamination," the seminar is open to administrators and engineers and is expected to draw more than 75 participants.

## Miniature TV Set Scores As Missile Target Seeker

Confidence in a miniaturized television set as an automatic target seeker in the nose of tactical missiles has been heightened at Northrop Nortronics by the recent successful completion of a program for the U.S. Army Missile Command's Future Missile Division.



Mr. Lane, supervisor of the Tracking System unit of the Tracking and Display Systems section.

Dick Satterfield and Stan Ecklin were responsible for electronic design; Earl Cornwell was responsible for mechanical design, and Paul Kirk was responsible for

electronic packaging.

Other personnel contributing to the program's success were A. V. Christensen, Joe Hibler, Miller Ching and Dick Paramore. The optical system was fabricated at Nortronics under the supervision of P. H. Halderman and Otto Hartman.

The entire guidance system was conceived by Missile Command (MICOM) which also developed the logic circuitry. Gene Widenhofer of MICOM provided the technical supervision for the Army, while Lieutenant Al Eachus provided program management.

Nortronics, a pioneer in electro-optical guidance for missiles (Snark, 1955-1957) was selected from 20 competitors to design the space stabilized television system and to build two prototypes.

In addition to the miniaturized television camera, which is gimbaled and stabilized on two axes, the system includes a control console. The console includes a television screen, which is used for target acquisition, and an isometric control stick which is used to position the camera in the missile. Two Nortronics Precision Products department gyroscopes are part of the guidance equipment.

"The most significant advantage of this type of terminal guidance for missiles," says Mr. Lane, "is that once you have acquired the target you can launch your missile and leave. No further communication with the missile is required once launched."

One existing missile, the Wall-eye, uses an optical guidance system, but the contour contrast seeker offers a considerable improvement in accuracy, Mr. Lane said.

While miniaturized television cameras have been developed for

## Doors Open For Families October 9

One of Northrop Corporation's most diversified and interesting operation centers — Nortronics Anaheim—will hold its first Open House in 10 years October 9.

The hours are 1 to 4 p.m. and all Nortronics employees, their families and guests are invited.

"We sincerely hope our co-workers at Hawthorne, Palos Verdes and Newbury Park will join us on this occasion to renew old acquaintances and see products they may have helped to development in a production environment," said Frank Lynch, Nortronics vice president and manager of Operations.

Each Nortronics employee has his personal invitation in his Nortronics badge. It will admit the employee, his family and guests.

Each employee will automatically become a host at this affair, not only in bringing his party into the facility, but also in conducting it about the premises. There will be no official tour route or guides other than the employee. He or she may take the party to points of special interest, remaining as long as the group likes before moving on to the next attraction.

Along the various main aisles, in offices and laboratories hosts and hostesses will be on duty, to assist visitors.

With the exception of the ordnance manufacturing area in Building Y-2, now undergoing major renovation, and a few isolated areas, the entire Nortronics Anaheim facility will be open to guests. Included will be all of Buildings Y-1, Y-3, Y-4, Y-7 and Y-12 as well as a portion of Y-2.

(See OPEN HOUSE, page 6)

## JA Veteran Named To Advisor Training

Leo Gross, a Nortronics Anaheim employee with an extensive history of service to Junior Achievement, has found still another way in which to serve this year.

Mr. Gross is one of a select group of instructors teaching an Orange County/Long Beach JA Advisor's Training program. It began three weeks ago and ends this week.

This special program gives adult JA advisors special schooling in operating JA firms, especially during the important organizational stage.

Three different groups have been attending the course. Included are representatives from 26 different firms who sponsor Junior Achievement activities.

Mr. Gross was an advisor for the first Nortronics-counseled JA firm organized and worked with other groups prior to that time. He has now served seven years in this important activity.

Junior Achievement firms will begin organizing in early October. Northrop Corporation divisions normally counsel five firms each year.



## GHOSTS ON THE WATER

## NRC Sea Scouts Win Trophies

Final standings for the Santa Monica Evening Outlook Trophy Yacht Race held over the Labor Day weekend showed a Northrop Norair family dominated one class.

George Larsen and his 11-year-old son, Andy, took first. Dan Larsen, another son, finished second.

The fact the Larsens did so well in the seven-mile race is noteworthy, but not unusual, since their name is more or less synonymous with the class and the boat that sails it—both known as Ghost.

Behind this and similar victories along the Southern California coastline is a sort of Horatio Alger tale of the yachting world. It led to establishment of this particular class in most yacht races.

Mr. Larsen is a Northrop Norair senior research engineer

in Manufacturing Research and Development. He is also NRC commissioner for Scouting. Dan Larsen, a college student, is First Mate of the NRC-sponsored Sea Scout ship "Seagull." He serves under Skipper Kenneth Van Wig.

About eight years ago the Larsens noted a lack of interest in some "Seagull" activities. So they designed a special mold from which 13-foot sailing sloops could be fashioned and suggested the youngsters utilize it to build boats for the group and even for their own, if they liked.

The idea caught on and the Larsen garage became a busy place. Young men worked there fashioning fiberglass hulls, centerboards and other components and elsewhere in machining parts, welding, soldering, shaping masts and even making sails.

For approximately \$200 and a lot of steady work, the youths could have their own completely outfitted sailing sloop. It had a five-foot beam and a six-inch draft (with the board up), plus a sail area of 105 square feet in a main and jib sail.

More, it was practically in-

destructible and could be righted without even getting wet. It weighed a mere 150 pounds, making it easy to fit atop an automobile or on almost any type of trailer.

The boys were free with their time and with the Larsen's help aided other Sea Scouts in building boats for their units.

Soon the sleek fiberglass speedsters began to appear on bays and in the ocean. They were able to go anywhere in good weather and sailed up and down the coast on longer and longer cruises. They were carted inland and sailed the larger waterways throughout the state, in Canada and Mexico.

About this time the little craft got their first name. Because "Seagull" members liked to invite their sistership Girl Scout Mariner group, called the "Sea Maids," for special cruises, the boats became known as "Romeos," a name that stuck until the Ghost terminology was deemed more applicable.

The Southern California Yacht Association granted the Sea Scouts special memberships which enabled them to race in most yacht events. Often sailing with inexperienced crews, the little speedsters would sometimes sail through whole fleets of larger, better-equipped yachts to post especially good times in events. From this grew the special Ghost class in which they now race.

Naturally, Sea Scouts have come and gone in the eight years and many have taken their boats with them, which adds to the caliber of skippers (See GHOSTS, page 5)



Wade Tilley contemplates narrow escape from golf ball.

## NRC 'Buys House' For Screen Epic

"Hawaii," the epic motion picture based on James A. Michener's greatest novel, will be shown exclusively to Northrop families and their friends October 25 through special arrangements of all NRC Councils.

Scheduled for 8:30 p.m. at the Egyptian Theatre, Hollywood, the showing is a featured pre-release premiere open only to select sponsors before the film is available for public viewing.

By "buying the house," all 1318 seats, NRC can bring this attraction to Northrop families and at the same time offer discount prices for reserved seats.

Regular \$3.50 seats will be available for \$2.80; \$3 seats for \$2.40; and \$2.80 seats for \$2.20. Tickets may now be obtained through Northrop ticket outlets.

Julie Andrews, Max Von Sydow and Richard Harris star in this film classic.

## SAFETY KNOWLEDGE SAVES EYE FROM GOLF BALL PERIL

Wade Tilley, a member of the Apollo staff at Northrop Ventura, came within about 30 seconds of losing his left eye recently—and it was his knowledge of safety which saved the eye.

Mr. Tilley, a weekend golfer, had just taken a badly cut golf ball from his 13-year-old son, Bill, who had accidentally run over the ball while mowing the family's lawn.

"I was telling Bill and my wife about how dangerous the caustic liquid in the center of a golf ball can be," Mr. Tilley said, "when the ball burst open, and the liquid squirted into my eye like a hydraulic explosion."

The force was so great, Mr. Tilley said, that the liquid which did not hit his eye and face squirted all the way to the ceiling.

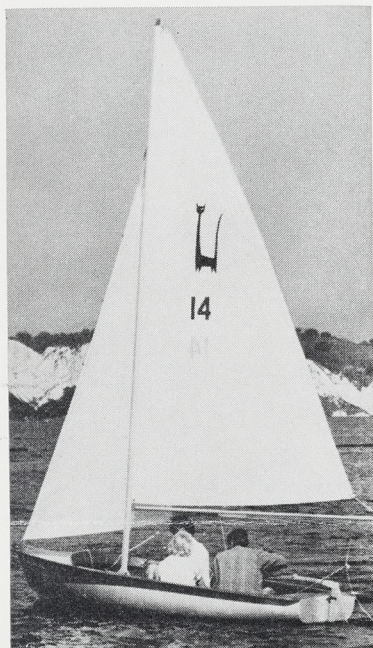
"I've worked with acids before," Mr. Tilley said, "so I knew what to do. I ran to the sink and rinsed the eye with clear water while my wife called the Conejo medical clinic to alert them that we were coming."

Mr. Tilley said the doctor told him that he would have been permanently blinded in the left eye had he not washed the liquid from it as soon as he did.

"Those things contain a mixture of liquid rubber and acetone," Mr. Tilley said, "and acetone will even burn normal skin."

There was no permanent damage to the eye, Mr. Tilley said.

"I was just trying to tell them how dangerous a liquid center golf ball could be when cut," he said, "but I didn't mean to show them."



Entry in a Ghost class race still bears "Romeo" emblem on its sail.

## Disneyland Tickets Still Available

Northrop Corporation ticket outlets are still offering tickets to a special Association of the United States Army "Night at Disneyland" set for October 28.

Tickets sell for \$3.75 and are good for all attractions and rides on an unlimited basis between the hours of 8 p.m. and 1 a.m. Northrop employees are special guests of AUSA for this event.

## 'WOULDN'T TRADE WITH A KING'

## With Classic German Sailplane, Kern Nears Gold Badge

"It's just you and God and the wind." That's how George Kern, Norair Systems Reliability supervisor, describes soaring, an interest he has held for more than 20 years.

Soaring, or gliding, as it used to be called, is not a new sport. It predated powered aircraft flight by a half-century. Its popularity in the United States is centered in California, New York and Texas, but its greatest following is still in Europe, where the sport was born.

England, Germany, Poland and the Soviet Union especially have more than their share of enthusiasts, and many sailplanes in use in the United States are imported from Germany, England or Poland. Many, of course, are from American manufacturers or are home-built.

Mr. Kern was introduced to soaring in Elmira, New York, in 1946, but never piloted a sailplane until two years ago, when he joined the Flight group of the Southern California Soaring Association in Los Angeles. Since then, he received his private glider pilot's license, and last year, after seeing an advertisement in Soaring Magazine, he entered into the sport in a full-scale manner.

The advertisement offered for sale a Minimoa, a classic among sailplanes, which was the last one built before World War II by Schempp-Hirth in Germany for Wolf Hirth's personal use. Mr. Hirth was the designer of the Minimoa and was to soaring what Babe Ruth was to baseball.

He lost his right leg in a motorcycle accident in 1926, and accomplished

most of his soaring feats after that. During World War II, the Hirth Minimoa was hidden in a shed deep in the Black Forest, as Mr. Hirth feared it might be appropriated by the military for training purposes.

After a life devoted to advancing the technology and sport of soaring, Wolf Hirth died three years ago.

Answering the advertisement, Mr. Kern contacted the owner, Mr. Klaus Rudolph, in Rendsburg, Germany, and went to Europe in February to buy the 27-year-old craft.

The purchase brought into this country one of the only two known Minimoes still flying in the world. The other, in Fort Worth, Texas, was brought to the United States in 1936 aboard the Graf Zeppelin, to compete in the 1936 world soaring championships. It since has been owned and flown by several top U.S. soaring personalities.

"I didn't have a chance to fly it until August," Mr. Kern said, "when I took it to Crystallaire, a gliderport near Pearblossom."

Because of the favorable atmospheric

conditions existing in the area, and the unequalled expanses of flat, unpopulated land, the California desert is one of the country's most popular soaring centers.

Crystallaire is 20 miles from Palm-dale, at the edge of the Mojave Desert, just north of the Angeles Crest Mountain range.

Wolf Hirth's plane was in good structural condition when it arrived in the United States, but needed to be completely refinished and equipped with instruments. Mr. Kern installed the instruments and finished the ship in ivory enamel, leaving the original tail markings untouched.

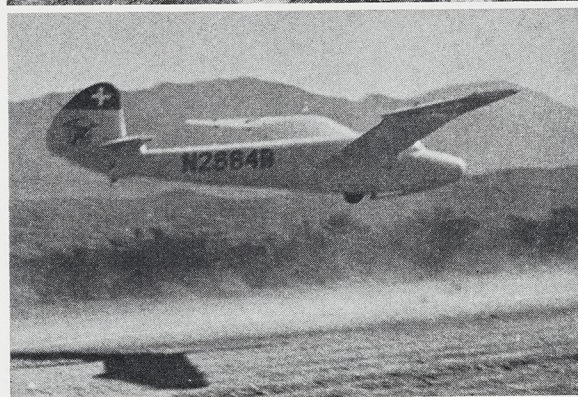
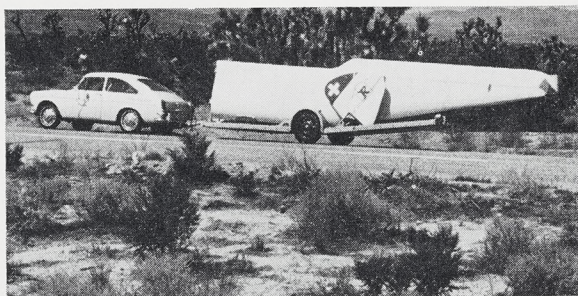
The plane has a wing span of 56 feet, weighs 572 pounds empty and about 750 pounds in flight, and is of all wood construction. It has a full monocoque fuselage and plywood and fabric-covered wings and tail surfaces.

The high, gull wing design was a notable characteristic of Wolf Hirth's designs.

"Soaring is not a daredevil sport," Mr. Kern said. "It's far safer than sky diving, auto racing or many other popular sports."

A pamphlet published by the Soaring Society of America (SSA) says soaring "bears the same relationship to powered flying that sailing does to power boating. A soaring pilot . . . flying . . . entirely by his knowledge of the air . . . would not change places with any king in history."

Mr. Kern agrees. He has flown many types of powered aircraft, but prefers (See SOARING, page 3)



George Kern shown going and coming (left photos) and in his sailplane cockpit (above).





The bronzelike statue in this pool is done in fiberglass by sculptor Bill Maloney of Redondo Beach. The pool is in front of the Nortronics Palos Verdes Administration building, site of a two-day art show next month. Mr. Maloney will be one of several sculptors, whose work will be on display.

## STATE OF THE ART SHOW

# Jewelry, Stoneware, Furniture, Oils . . .



Virginia MacSparan serves refreshments (above) to press preview showing earlier this month. Bill Martin (below) shows Sally McAller a display of his hand-wrought silver jewelry.

Art, from jewelry making to furniture design and from stoneware to oils, will be on display at Nortronics Palos Verdes soon in the Palos Verdes Community Arts Association's third annual show.

More than 100 of Southern California's top amateur and professional artists and craftsmen have accepted invitations to display their work. The show will be held from 11 a.m. to 6 p.m. October 15 and 16 on the lawns and parking areas of the Palos Verdes facilities.

A dinner will be held on the patio of the Administration building.

Recently, the Association held a press preview, at which many of the artists gave photographers an advance look at their exhibits.

Many of the pottery makers will demonstrate use of the potter's wheel.

A special section will highlight children's art, and the NRC Art Club will have a display.

Many of the works shown

will be for sale.

The first show sponsored by the group was held in Portuguese Bend. The second was in Palos Verdes Estates.

President of the group is Mrs. Tom Carvey of Palos Verdes Estates.

Lyn Sims of Palos Verdes Estates and Sally McAller of Rolling Hills Estates are co-chairmen for the show.

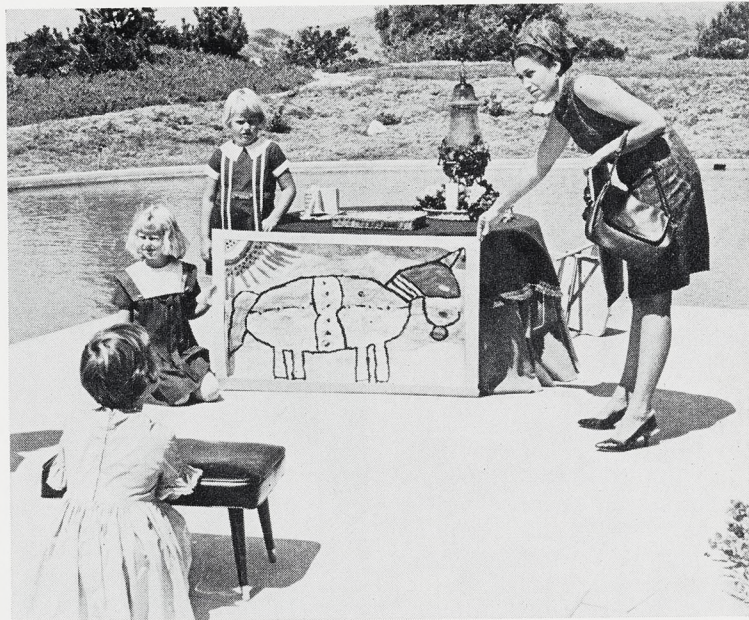
## 1967 European Tour Reservations Opened

Northrop Recreation Clubs are combining their efforts to stage a European group tour next year, departing May 18 and returning June 7, via Air France jet.

Air fare will be \$325. Optional are tours of Southern Europe (for \$350) or the Scandinavian countries (for \$375).

Reservations are now being taken at Northrop Personnel Activities office where preliminary itineraries may be obtained.

Randy Lee of Nortronics Anaheim is the coordinator.



Mrs. Lyn Sims (above), a co-chairman of the Palos Verdes Community Arts Association annual show, looks at paintings by children of Mr. and Mrs. Don Hollingshead. Frank Matranga (below) will give demonstration on potter's wheel at the October 15 and 16 show on grounds of Northrop's Palos Verdes Research Park.



Several artists with their works pose for photographers.

# SOARING: Just You and God and the Wind

(Continued from page 2)

soaring to any other type of flight.

In the small cockpit of a sailplane, the only instruments are an air speed indicator, altimeter, compass, variometer (which is an extremely sensitive instrument which detects rising or falling air currents), rate-of-climb indicator, vertical accelerometer and clock.

Flight controls are similar to those in standard aircraft, since the soaring pilot's need to maneuver is the same as that of a powered aircraft pilot. In addition to the rudder, elevator, and aileron controls, most sailplanes are equipped with spoilers and/or dive brakes, which permit them to land in extremely short fields.

Meteorological knowledge applied to the sport, Mr. Kern said, has enabled pilots to ride "thermals," warm columns of air which rise from the ground, for many hours, generally by circling within the column.

Thermals are the result of unequal heating on the earth's surface from the sun. The top of a thermal, usually marked by a cumulus cloud, may be as high as 20,000 feet or more above the ground.

On September 4, flying from El Mirage in the Mojave, Mr. Kern completed two of the three requirements for a gold badge, one of the highest awards given in soaring.

He was in the air for 5 hours and 40 minutes; 40 minutes longer than required. His top altitude of 15,220 feet above sea level was 11,320 feet above the low point of his flight (an altitude gain of 9843 feet is necessary for qualification).

Soon he expects to complete the final requirement, flying 195 miles from Crystallaire to Las Vegas (minimum cross-country qualification is 187 miles—300 kilometers—to a predetermined destination).

Badges are awarded by the Federa-

tion Aeronautique Internationale.

Sailplanes may be launched by a ground-mounted power winch, by a car towing the plane down the field, or in tow from an airplane.

Advantages of an airplane tow, Mr. Kern said, are a higher release altitude and the ability to fly toward an area of favorable lifting conditions, instead of being limited to launching in the area adjoining the launch site.

Mr. Kern, a Norair employee for four years, is a director of the Southern California Soaring Association, which is affiliated with the SSA. He also is the manager of the SCSA Flight Group, which trains newcomers to the sport and hopes to give a start in soaring to those who may someday be on the U.S. team in the World Soaring Championships.

Mr. Kern plans to make soaring a 12-month hobby, even though the summer months are best because of the warmer air conditions.

The Kerns live in Inglewood.





## FOR BOEING 747 AIRFRAME

## Training Program Graduates Designers

Twenty-three Northrop Corporation student employees received graduation certificates earlier this month in recognition of their capability to become members of Norair's design organization.

Certificates for the unusual company-sponsored course were presented by Warren Klauer, Norair's project director, Boeing 747 Technical Program, following an address by Ken Strite, dean of the Northrop Institute of Technology Engineering School.

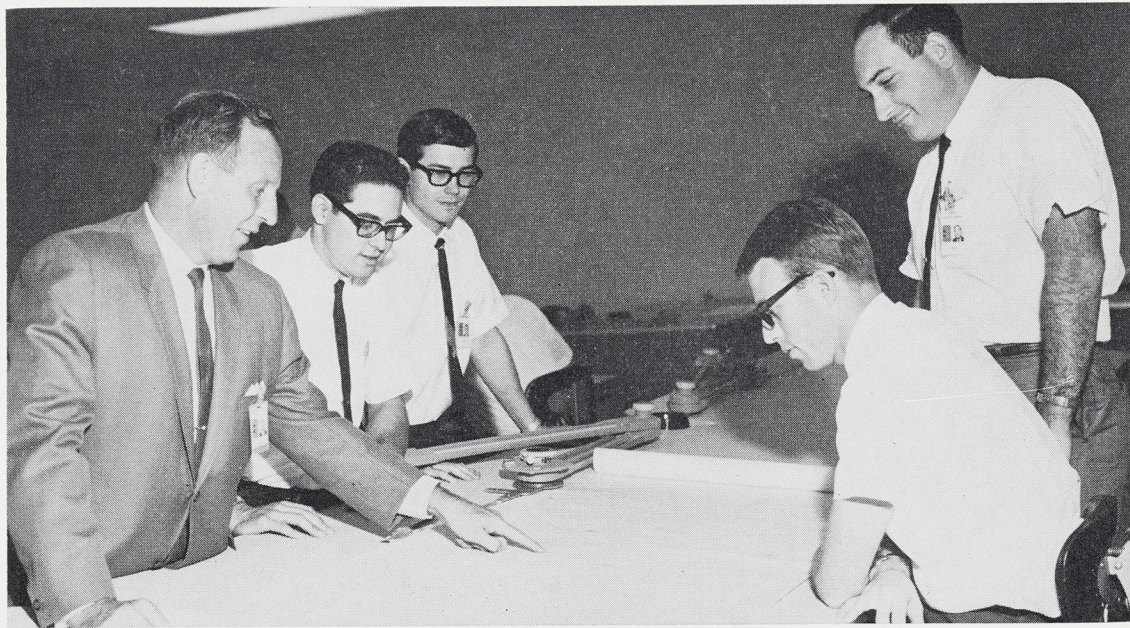
The new airframe designers have successfully completed a 320-hour college-level training course given by the Northrop Institute of Technology under contract to Norair's Personnel Development and Training group.

Graduates had previously completed a portion of their academic engineering training or had been practicing design engineers in other industries to qualify for entry in the Norair sponsored course of instruction. Norair has scheduled another class for potential design engineers to begin on October 10. Students accepted for training are hired as "designers in training" and remain in that classification until course completion, when they are reassigned to their work organization.

According to Mr. Klauer, "a critical shortage of airframe and aerospace equipment designers exists in Southern California. This method of training basically qualified people is one of the few ways for Norair to hire this needed skill for our future Boeing 747 production program."

All of the graduate airframe designers of the Northrop course will be assigned to his department.

Northrop will continue to conduct training courses to provide personnel resources in critical hard core engineering specialties. Most personnel increases are attributed to preparation for production of the 150 foot long fuselage for The Boeing Company. A new transport production facility for that purpose is under construction at the Hawthorne plant.



TAKE IT FROM HERE—Warren Klauer (left), Norair project director, Boeing 747 Technical Program helps (from left) Jerry Manzanarez, Michael Keith, Kenneth Hirsch and Stanley Ossoff get started on technical problem. The men are

part of a group of 23 student employees who recently graduated from 320-hour, college-level training program for airframe designers. All are on the joint 747 Program staff under Mr. Klauer.

## 'LEADERSHIP THAT LEADS'

## Managers to Hear Famed Consultant

"Leadership That Leads."

That's the topic of a speech to be delivered next week by Dr. Kenneth McFarland, appearing before a joint meeting of the Northrop Nortronics and Northrop Ventura Management Clubs.



Dr. McFarland

Social hour will begin at 6:30 p.m., October 5 at the Roger Young Auditorium, 936 W. Washington Blvd., Los Angeles. Prime rib dinner will be

served at 7:30.

Dr. McFarland, author of the book "Eloquence in Public Speaking," has been a guest lecturer and corporation consultant for 20 years. One biographer has called him "the home run king of the speaking world," and another said he is "the nation's most eloquent speaker on the American System. His speeches reflect a pleasing blend of solid experience, sound scholarship, practical idealism and good hu-

mor."

The meeting is the sixth and final one in a series of Northrop Ventura Management Club-sponsored lectures

## Millions Watch Northrop Chutes Land Gemini II

Millions of Americans on September 15 were treated to a ringside television view of Northrop Ventura's Gemini parachute landing system when Astronauts Charles Conrad and Richard Gordon returned from their three-day flight in space.

At the conclusion of probably the most nearly perfect flight in the Gemini series, the GT-11 spacecraft floated gently to a landing in the Atlantic, less than two miles from the USS Guam recovery aircraft carrier.

Cameramen aboard the ship picked up the descending 84-foot parachute moments after it opened and followed it all the way down to splashdown about 700 miles east of Cape Kennedy.

Clearly visible on television were the main parachute, the pilot parachute carrying the rendezvous and recovery canister, and the bridling sequence as the astronauts shifted from vertical to near horizontal position.

During their more than 70 hours and 44 revolutions aloft, Astronauts Conrad and Gordon established several space records. These included rendezvous and docking with an Agena target satellite during their first revolution, an altitude record of more than 850 miles, and tethering of two vehicles, their spacecraft and the Agena target.

At the conclusion of the flight, Dr. Robert Gilruth, administrator of NASA Manned Spacecraft Center, Houston, congratulated the NASA, Defense Department and industry teams on the excellent flight. "The performance of everyone was flawless," Dr. Gilruth said.

Gemini 12, the final in the nation's Gemini program, is tentatively scheduled to occur within the next two months.

on "Communications in Management."

The event is open to Management Club members, their wives, and outside guests.

Reservations may be made by contacting Harvey Cook, Norair Ext. 1353; Richard De Fussi, Nortronics Hawthorne Ext. 538; Don Archer, Ventura Ext. 429; or Ben Kapp, Ventura Ext. 669.

In other Management Club activities, Ventura president Bill Young has announced that the group's annual dinner-dance will be held at the Las Posas Country Club in Camarillo on December 3.

## Fashion Show

Tickets will be available early next month for the October 22 NRC (Anaheim) Women's Club's "Artistry in Fashion" show to be staged at the beautiful Los Coyotes Country Club.

## HAMILTON HEADS NEW CORPORATE ORDNANCE POST

Appointment of Douglass W. Hamilton to the newly-created position of Corporate manager of Ordnance Plans and Programs for Northrop Corporation has been announced by Glenn R. Lord, Northrop vice president of marketing.

Mr. Hamilton will be responsible for planning and integrating Northrop's unified ordnance marketing program.



Mr. Hamilton

Mr. Hamilton has been a member of the Northrop marketing organization for 15 years. Prior to joining the company he served in the U.S. Air Force as a command bomber pilot and as a test pilot.

Assisting Mr. Hamilton in his new assignment will be four regional representatives. They are David A. De Lo, eastern regional operations, Washington, D.C.; Kenneth Snelling, western regional operations, San Bernardino, California; William Boggess, southeast regional operations, Eglin AFB, Florida; and Anthony Demetriou, central regional operations, Asheville, North Carolina.

## 235 Pints of Blood Given at Hawthorne

First and second shift personnel manning Hawthorne operations donated 235 pints of blood September 8 in support of the program to replenish blood supplies in Vietnam.

Northrop Corporation personnel have now given 635 pints in this nationwide effort staged in response to an appeal from the Department of Defense for assistance. At the same time Northrop's credit with local blood banks has been increased accordingly.

Next scheduled bloodmobile visit for the Hawthorne area is now scheduled for December 1.

## JEANNE CAME THROUGH



Before this Northrop around-the-world tour group departed, NRC Commissioner Jeanne Andrecht suggested a pre-departure picture. NORTHROP NEWS editors countered with a suggestion picture be taken in a more appropriate setting. So here are the travelers, including Jeanne, before India's famed Taj Mahal just before they departed for Iran on a tour they described as "wonderful."



Five Northrop employees recently visited the Orthopaedic Hospital in Los Angeles for a graphic demonstration of how AID-United Givers funds, like those contributed by Northrop employees, are put to work. A vivacious little patient named Charlene reacts to visit by Rochelle Kraus and Frank Macias. Annual AID-United Givers and NORaid drive opens at Northrop next month.



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

# Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

For Sale
<b>Willys Jeep</b> , 1962, CJ5, 10,000 miles, new top, elec. wipers, & new paint, locking hubs, other extras, \$1500. Gardena, 324-7442. A
<b>TV</b> , Magnavox, 19" portable, walnut case w/stand, 2 yrs. old, \$75. Torrance, 327-8226. A
<b>Impala</b> , 1958 sport coupe, 345 cu. in. w/3 3-bbl. carbs., chrome reverse rims, \$700. Lynwood, 632-2632. A
<b>Dresser</b> , walnut, headboard, \$18. Hawthorne, OS 6-3410. A
<b>Volkswagen 1300</b> , 1966, 5900 miles, w/w tires, \$1675. P. V. Pen., 377-7555. A
<b>Dishwasher</b> , 1966 GE portable, \$115. W.L.A., 277-2549. A
<b>Outboard Motor</b> , 1961 Mercury, all elec., 60 h.p., \$350. Hawthorne, 676-7109. A
<b>Piano</b> , upright, \$150. L.A., 757-3595. A
<b>Volkswagen</b> , 1965, \$1500. Torrance, DA 5-7154. A
<b>Kittens</b> , 2 male Siamese, 1 blue & 1 seal-point, \$15 ea. Lawndale, 371-3919. A
<b>Honda</b> , 1965, 250 Scrambler, large jets, \$500. Inglewood, 676-8982. A
<b>Lot</b> , R-2 in Palm Springs Panorama, \$5000. Torrance, 370-4641. A
<b>Transmission</b> for 1965 Volkswagen, 4-spd., all synchro, \$125. Port. Bend, 377-2921. A
<b>Kitchen Chairs</b> , 4, Early American, need reupholstering, \$6. Torrance, 371-1096. A
<b>Life Raft</b> , inflating cylinder or manual, \$150. Redondo Bch., FR 9-1804. A
<b>Playpen</b> , Babyline, \$5. Inglewood, 674-6395. A
<b>Rods &amp; reels</b> , 2 12' custom surf, in sets only, many other combs., \$35. Torrance, 371-9925. A
<b>Skis</b> , metal, Fisher Alu Reisen-Slalom, length, 195 cm., Marker Toe bindings, Marker turntable, long thong, used 1 yr. \$105. P.V. Pen., FR 7-3888. A
<b>Lawn Mower</b> , power, reel-type, auto-rewind, \$25. Torrance, 375-6467. A
<b>Falcon</b> , 1963, Ranchero, r/h, 6-cyl. auto., \$800. Burbank, 846-1016. A
<b>Washer</b> , Westinghouse, hvy-duty, front load, 18 mos. old, \$100. Hawthorne, 675-7928. A
<b>Relax-A-Sizer</b> , used once, cost \$300; \$225. Torrance, 370-0239. A
<b>Mustang</b> , 1965, 3-spd. trans., stereo tape unit, \$1600. Inglewood, 672-1010. A
<b>Ford</b> , 1962, 9-pass. Country Sedan, all extras, 45,000 miles, \$950. Manhattan Bch., 376-9970. A
<b>Home</b> , 3-bdrm., newly decorated, dble. detached gar., covered patio & car port, cpts., dps., awnings, fenced yard, will take small down or mobile home for equity, balance on G.I. loan at 5 1/4%, \$23,600. Long Bch., 429-4349. A
<b>Desk Lamp</b> , twin fluorescent bulbs, completely adjustable, spring loaded, made in Norway, cost \$30; \$10. Marina del Rey, 823-2655. A
<b>Box Spring</b> , mattress, twin size, extra firm, \$20. Redondo Bch., FR 2-3827. A
<b>Chevrolet Impala</b> , super sport, full power, 327 V-8, air, \$1595. Manhattan Bch., FR 6-5192. A
<b>Mobile Home</b> , 10'x40' Biltmore, 1964, parked near Northrop, \$3000. Gardena, 327-2698. A
<b>Golf Clubs</b> , left-handed, 2-9 irons, 1, 2, 3 woods, \$35. Torrance, 324-9193. A
<b>Dining Set</b> , 8-pc. Mediterranean, table w/2 leaves, seats 12, 6 chairs recently upholstered, rose velour, buffet, \$450. Torrance, 326-4379. A
<b>Changer</b> , Garrard type A, w/Shure M3D cartridge & walnut base, also plastic cover, \$45. Westchester, OR 2-4828. A
<b>Furniture</b> , love seat & his & hers chairs, antique w/original covering, rust colored, \$275. Inglewood, 673-1133. A
<b>Porsche</b> , 1965 SC coupe, AM/FM Blaupunkt, tuned exhaust, \$3950. Lancaster, WH 8-4103. A
<b>Movie Camera</b> , 8mm Mansfield Holiday auto. zoom lens, pistol grip, leather case, tripod in case, used 3 times, \$60. Lynwood, 638-3423. A
<b>Volkswagen</b> , 1964, metal sunroof, push-out rear window, orig. owner, \$1295. Torrance, 755-8153. A
<b>Cadillac</b> , 1956 coupe de ville, all power, very low mileage, new paint, good tires, \$495. Rolling Hills, FR 7-3487. A
<b>Corvair</b> , 1962 Monza, 4-spd. trans., 1-owner, \$750. Orange, 714-637-5855. A
<b>Home</b> , 2-bdrm., stucco, dble. detached gar., carpeting throughout, dps., dishwasher, garb. disp., sprinklers, close to Hawthorne schools, & shopping area, \$22,500. Hawthorne, OS 6-5622. A
<b>Surfboard</b> , Hobie, fiberglass over Balsa wood, wt. 30 lbs., 22"x9'9", \$80. Gardena, DA 4-2230. A
<b>House</b> , Torrance, 3-bdrm., 2 baths, lge. covered patio, btlins, w/w cpts., 5 1/4% mortgage, \$141 mo. pymts., \$27,500. P. V. Pen., 377-9666. A
<b>Pontiac</b> , 1964 Star Chief, 4-dr., auto. trans., r/h, p/s, orig. owner, 31,000 miles, \$1700. Lawndale, 370-3821. A
<b>Dishwasher</b> , portable auto., General Electric, under guarantee, \$180. Yorba Linda, 714-528-9227. A
<b>Lot</b> , 80'x100', at Snow Summit, Big Bear Lake, 1 block from ski lift, financing avail., utilities avail. at lot, \$6950. Fullerton, 525-1677. A

For Sale
<b>House</b> , 4 lge. bdrms., 1 1/4 baths, family rm., fireplace, cpts., dps., btlins, approx. 2100 sq. ft., pool, sell FHA, \$27,500. Orange, 714-637-7410. A
<b>Sewing Machine</b> , Kenmore portable, \$15. Inglewood, 755-1071. A
<b>Buick</b> , 1962 Skylark convt., p/s, p/b, p/top, \$1095. Somis, 805-482-1186. A
<b>Baby Furniture</b> , crib, mattress, mesh play pen, stroller, car seat, hi-chair, jumper, infant seat, \$50. Manhattan Bch., FR 4-4780. A
<b>Aquarium</b> , 5-gal. w/filter & motor, 30 guppies, \$5. Torrance, 370-6734. A
<b>Cadillac</b> , 1949, r/h, 51,000 act. miles, good tires, \$80. Hawthorne, 676-2803. A
<b>Studebaker</b> , 1959, \$50. Gardena, 532-5086. A
<b>Camping Trailer</b> , Shasta 13', sleeps 5, butane-stove w/oven, 50 lb. ice box, awning & extras, \$575. Redondo Bch., 375-4646. A
<b>Encyclopedia</b> , Standard, incl. medical dictionary & set of classics, orig. cost, \$400; \$275. Torrance, 370-9672. A
<b>Station Wagon</b> , 1958 Mercury, 430 cu. in. V8, \$125. Hawthorne, 644-3487. A
<b>Pontiac</b> , 1963, LeMans convt., new tires & trans., \$1100. Glendale, 244-7493. A
<b>Darkroom Equipment</b> , photographic, 2 1/4x3 1/4 enlarger w/distortion control, montage masks, printer, developing tanks, timer & access., \$175. Miraleste, 831-5615. A
<b>Pontiac</b> , 1955 2-dr., \$100. L.A., 275-9441. A
<b>Oldsmobile</b> , 1961, Super 88 Holiday, fully auto., 4 dr. h/top, \$895. Torrance, 329-6748. A
<b>Silverware</b> , silverplate, setting for 8, w/case, \$9.90. Hawthorne, 676-0418. A
<b>Willys</b> , jeep station wagon, 1952, 400 miles on rebilt. eng. & trans., rebushed front end, \$145. L.A., 472-3374. A
<b>Ford</b> , 1956, new rebuilt auto. trans. & carburetor, \$100. L.A., PL 4-1628. A
<b>Chevrolet</b> , 1960 2-dr., stick shift, 348 cu. in. eng., new brakes, tires, battery, shocks, ball joints, \$800. L.A., 670-5084. A
<b>Parachute</b> , 28' orange & white, modified to double T w/harness, also 24' camouflage reserve chute, \$55. Inglewood, OR 7-8301. A
<b>Desk</b> , maple, \$20. L.A., AX 4-0727. A
<b>Dryer</b> , 1964 Kenmore, 220 volt, used 8 mos., \$70. Hawthorne, 676-3548, OS 5-4380. A
<b>Bed</b> , dble., box spring & Simmons mattress, \$40. P.V. Pen., 377-6648. A
<b>Sailboat</b> , 1941 Weber, 20' L.O.A., 7' beam, sleeps 2, 3.5' draft, galley, 170' sail area, main & working jib, 20 h.p. inbd. eng., 7/8" mahogany planked hull, \$1850. Hermosa Bch., 374-0548. A
<b>Motorcycle</b> , 1965 Harley Davidson M-50, 50 cc eng., over 100 mpg, 2700 miles, \$135. Culver City, 398-3349. A
<b>Sailboat</b> , 10' fiberglass Elgin w/dacron sail & trailer, \$250. Long Bch. GA 7-4197. A
<b>Mercury</b> , 1963 Monterey, 4-dr. h/top, p/s, p/b, r/h, factory air cond., \$1550. Gardena, DA 9-1652. A
<b>Ford</b> , 1957, 2-dr. Victoria, r/h, p/s, new trans. & starter, needs eng. work, \$150. L.A., PL 6-2314. A
<b>Lawn Edger</b> , elec. Silex, \$10. Culver City, VE 9-5438. A
<b>Lamp</b> , adjustable heat & sun, \$1.50. Redondo Bch., 379-1049. A
<b>Plymouth</b> , 1960, 6-cyl. station wagon, \$795. Redondo Bch., 374-1124. A
<b>Land</b> , 23 acres near Lake Isabella, good water area, \$1000 acre w/\$5000 dn., \$20,000. Orange, 714-532-1361. A
<b>House</b> , 3-bdrm., 1 1/2 bath, 5 1/4% G.I. loan, separate outside den, in tree sect. of Manhattan Bch., \$29,000. Manhattan Bch., 372-8536. A
<b>Volkswagen</b> , 1960 sedan, 30 mpg, gas gauge, 4 seat belts, \$750. Santa Monica, 395-0816. A
<b>Coin Collection</b> , U.S. & foreign, proof, mint, gold, \$190. Box 1901. A
<b>Air Conditioner Unit</b> , Poleair, compressor mounts for 6-cyl. motor, \$40. Manhattan Bch., 372-6393. A
<b>Austin Healey</b> , 1966 3000 MK III, all access. & 8-track stereo, \$3200. Hermosa Bch., 372-5933. A
<b>Travel Trailer</b> , 18' Roll-A-Long, twin beds, 6 cu. ft. refrigerator, new 6-ply tires, elec. brakes, 20-gal. glasslined water tank, furnace & new awning, \$650. Santa Monica, EX 4-8641. A
<b>Lot</b> , in Woodland Hills, large pad w/80' frontage, streets & sewers in about 1 year, \$1500 dn., \$11,950. Playa del Rey, 823-1962. A
<b>Dining Table</b> , oval, French Provincial, 40"x54", 2 9" leaves, \$65. Hermosa Bch., FR 4-8036. A
<b>Encyclopaedia</b> , Britannica, world language dictionary in 2 vol., cost \$35; \$15. P.V. Pen., FR 8-1863. A
<b>Wood Shaper</b> , heavy duty, 1/2 h.p. motor, \$50. Huntington Bch., 714-897-6992. A
<b>Organ</b> , Hammond M-3 spinet w/percussion, unmarred maple finish, \$750. San Pedro 831-5837. A
<b>Surfboard</b> , Velzy, custom-made 9'1", \$40. Newbury Pk., 498-2545. A
<b>Divan</b> , chair & 2 mahogany stepend tables, \$30. Hawthorne, 675-8413. A
<b>Volkswagen</b> , 1965, sedan, steel sun roof, radio, shoulder straps, \$1350. Torrance, 371-9730. A

For Sale
<b>Oven</b> , Gaffers & Sattlers bltin, single dr. & broiler, gas, copper tone finish, \$25. Lawndale, 679-2642. A
<b>Drum Set</b> , \$50. Torrance, 328-4647. A
<b>Supercharger</b> , Judson, for VW, all parts & instructions, \$85. Lomita, 326-0221. A
<b>Travel Trailer</b> , 16' Scotsman, many extras, completely equipped, \$450. Long Bch., 425-1938. A
<b>MG TD</b> , 1951, eng., brakes, clutch, gear box o/hailed, 5000 miles, \$695. Manhattan Bch., FR 9-7775. A
<b>Guitar</b> , Guild Troubadour, 6-string, orig. cost, \$150; \$80. P.V. Pen., 377-9723. A
<b>Camera Lens</b> , Nikkor F, 28mm, f/3.5, wide angle, cost \$179; \$95. Box 1902. A
<b>Refrigerator-Freezer</b> , portable, 110-120 volt house current or 12 volt car battery, 5 cu. ft., cost \$130; \$75. Gardena, 323-8657. A
<b>Outboard Motor</b> , Evinrude, 9.7 h.p., \$40. Torrance, DA 6-8273. A
<b>Bar-B-Que</b> , gas, never used, \$15. Hawthorne, 679-5371. A
<b>Dinette Table</b> , Formica top w/leaf & chairs, \$15. Inglewood, PL 5-8158. A
<b>House</b> , 2-story, 4-bdrm., 2-bath, fireplace, cpts., dps., next to school & golf course, 5 1/4% FHA loan, \$26,900. Torrance, 375-6071. A
<b>Surfboard</b> , Roberts, 9'8", 3 stringers & redwood tail block, \$62. Westchester, 670-0472. A
<b>Boat</b> , 14' outboard motor, Evinrude 25 h.p. & trailer, \$295. Gardena, DA 4-8853. A
<b>House</b> , 1315 sq. ft., 3-bdrm., 2-bath, dble. gar., cpts. & dps., about 5 yrs. old, 20 min. from Norair, existing loan for \$18,500 at 5 1/4% int., \$145 mo. pymt., owner take 2nd for part of bal. w/small dn., \$23,750. Wilmington, 830-0740. A
<b>Oldsmobile</b> , 1955 Super 88 Holiday 4-dr. h/top sedan, Hydramatic, p/s, p/b, AC smog control, new brakes, w/s/w tires, battery, ignition wiring, \$200. Downey, 861-7035. A
<b>Ford</b> , 1957 Fairlane, T-Bird special eng., auto. trans., p/s, \$280. L.A., 670-3892. A
<b>TV Set</b> , 1963 21" console w/remote control, \$100. Inglewood, OR 7-8868. A
<b>Stove</b> , elec., General Electric, \$25. Redondo Bch., FR 5-5760. A
<b>Volkswagen</b> , 1956 sedan, radio, \$350. Inglewood, 675-8173. A
<b>Washer</b> , Easy, wringer-type, \$25. Hollydale, ME 3-2395. A
<b>Corvair Monza</b> , 1964 convt., r/h, w/w tires, low mileage, \$1495. San Pedro, 831-5283. A
<b>Ford</b> , 1957 Ranchero pickup, air cond., r/h, near new motor, \$650. Hawthorne, OS 5-8335. A
<b>Lawn Sweeper</b> , Parker rotary brush w/catcher, \$9.95. Inglewood, 675-0788, 10 a.m. to 2 p.m. A
<b>Table</b> , Drexel Harvest, w/4 chairs, walnut, \$150, other pieces various price. Hermosa Bch., 374-1337. A
<b>Tape Recorder</b> , Tentron, \$50. Box 1903. A
<b>Stove</b> , gas, \$20. Newport Bch., 714-646-7605. A
<b>Citizen Band</b> , 2-way radio Exec., 5 watts, w/antenna, extras, \$125. Torrance, 325-3724. A
<b>House</b> , Inglewood Knolls, 3-bdrm., 1 1/4 baths, cpts., dps., fireplace, forced air heat, \$24,950. Hawthorne, PL 4-2049. A
<b>Television</b> , 23" 1963 Packard Bell, mahogany console cabinet, \$75. Torrance, DA 6-8590. A
<b>House</b> , 3-bdrm. & lge. den, space for boat, near fwy. & schools, cpts., dps., conv. financing, 10 min. to Norair, \$21,900. Gardena, DA 9-2040. A
<b>Motorcycle</b> , 1964 Honda 305, Super Hawk, low mileage, \$395. Granada Hills, 363-3987. A
<b>Refrigerator</b> , Philco, \$20. Manhattan Bch., FR 9-5024. A
<b>TV</b> , 1960 G.E., portable, w/stand, needs tubes, \$45. Hawthorne, 675-5265. A
<b>Racing Bicycle</b> , 10-spd., Dinamo, lamp, \$18. Inglewood, 674-1885. A
<b>Lot</b> , 2, Topanga Canyon, adjacent w/5000 sq. ft., water & elect. in, low taxes, financing avail., low pymts., \$3500 ea. Pasadena, 823-2523. A
<b>Guitar</b> , elec. & amplifier, 2 mikes, never played, cost \$96.20; \$70. So. Gate, 633-4477. A
<b>Chevrolet</b> , 1953, new eng., trans., rearend & brakes, 1963 Chev. SS bucket seats, \$350. Box 1904. A
<b>Chevrolet</b> , 1954 station wagon, new tires, short block w/20,000 mi., good clutch, \$75. L.A., 755-8233. A
<b>Movie Camera</b> , 8 mm Bolex P-1 zoom lens & meter, \$150. P.V., 377-5059. A
<b>Telescope</b> , Swift refractor-type, 3" objective lens, 4-eyepiece turret head, mounted on tripod, wood carrying case, many extras, \$200. Box 1905. A
<b>Range</b> , Tappan 400 elec., all access., 2 ovens, \$300. Box 1906. A
<b>Trombone-Conn</b> , Connquest, blue case, cost \$200; \$175. L.A., PL 1-4014. A
<b>Home</b> , 2-bdrm., full dining room, fireplace, dble. gar., \$20,950. Inglewood, OR 1-3860. FR 5-5097. A
<b>Motorcycle</b> , 250 cc Yamaha YDS-2, 1964, \$385. Rolling Hills Ets., 375-7038. A
<b>Comet</b> , 1961 deluxe, 1-owner, low mileage, good tires, stick shift, \$450. Gardena, 327-2756. A

Wanted to Buy
<b>Pool Table</b> , 4'x8' slate top, any condition at right price. Redondo Bch., FR 2-8254. B
<b>Power Edger</b> , Santa Monica, 392-2136. B
<b>Snow Skis</b> , men's. Lawndale, 676-2720. B
<b>Trailer</b> , 14' to 18', preferably self-contained, must be priced reasonably. Santa Monica, 393-1106. B
<b>Bar Bell Set</b> , approx. 100 lbs., Torrance, 371-1830. B
<b>Hardtop</b> , for Austin Healey, 1959 roadster. Hawthorne, 675-9552. B
<b>Amplifier</b> for bass & lead guitars, must be heavy enough to handle volume, Fender or Vox preferred. Hawthorne, OS 6-8331. B
For Trade
<b>Contact Printer</b> , Airequipt, takes up to 4x5 neg., & 16x13' elect. print dryer, trade for U.S. &/or foreign stamps. Box 1907. C
FREE (To Be Given Away)
<b>Dog</b> , miniature Schnauzer, male, black, registered, 4 yrs. old. Hawthorne, 675-1683. D
Rentals Offered
<b>Bachelor Apt</b> , furn. utilities pd., 2 blks. to Norair, \$85 mo. Hawthorne, OS 6-7417. E
<b>House</b> , 3-bdrm., 1 1/4 baths, disp., fenced yd., near shopping, lawn & water pd., 8 min. to Norair, \$130 mo. L.A., PL 4-1964. E
<b>Apt</b> , 1 & 2 bdrm., 1-bdrm. furn., quiet adult bldg., near all, \$110 & up. Woodland Hills, 347-5000. E
<b>Sleeping Room</b> , \$12 wk. Inglewood, 671-3798. E
<b>Apt.</b> , 1-bdrm, cpts., drps., btlins, gar., close to Northrop, \$95 mo. Harbor City, 325-5705. E
<b>Executive Home</b> , on 1/2 acre, harbor view, 3 bdrm., 1 1/2 baths, den, enclosed patio, 3 fireplaces, lge pool, avail. Oct. 15, \$400 mo. w/option to buy. Torrance. 324-7119. E
<b>House</b> , 2-bdrm., unfurn., cpts., fenced, \$110 mo. Torrance, 378-0500. E
<b>House</b> , 3-bdrm., fenced yd., near Northrop Norair, children OK, \$175 mo. Gardena, DA 4-9321. E
<b>House</b> , 2-bdrm., 2 bath, rumpus rm., 2 fireplaces, cpts., dps., elec. range, fenced yd., 2-car gar., water pd., \$250 mo. Inglewood, 672-3764. E
<b>House</b> , 3-bdrm., 1-bath, disp., cpts., fenced, water, trash & yard care paid, newly painted, \$165. Torrance, 370-2794. E
<b>Cabin</b> , Lake Arrowhead, walk to lake & village, fireplace, all modern facilities, \$25 w/end; \$55 wk. No. Hollywood, 761-9645. E
<b>Cabin</b> , Big Bear Lake, mod., sleeps 7 to 9, \$18 w/end; \$50 wk. Bellflower, TO 7-0662. E
<b>Apt</b> , deluxe 2-bdrm. unfurn., lge. pool & patio, cpts., dps., btlins, closed gar., near El Camino, adults, \$120. Torrance, DA 9-5986. E
<b>Apt</b> , 1-bdrm., unfurn., pvt. patio, closed gar. sound conditioning, hobby shop, hot water & trash pd., \$95 mo. Torrance, FR 5-0867, 320-7547. E
<b>Apt</b> , 2-bdrm., cpts., dps., encl. porch, gar. & laundry room, near shopping, \$105. unfurn.; \$130 furn. Torrance, DA 3-7544. E
<b>House</b> , 2-bdrm., near Northrop, water & trash paid, disposal, \$110 mo. Lawndale, 675-9695. E
<b>House</b> , 3-bdrm., in Mar Vista, fenced front & back yards, disp., cpts., gar., lease required, no pets, \$170. Santa Monica, EX 4-3345. E
<b>Apt</b> , 1-bdrm., furn., all btlins, pvt. deck, lge. pool, ample sub. parking, near Northrop, \$135 mo. Lawndale, 679-2117, 670-6684. E
<b>Studio Apt</b> , 2-bdrm., 2 1/2 bath, pvt. deck, sub. gar., cpts., dps., dishwasher, elec. btlins, near San Diego Fwy., adults, lease, \$180. Inglewood, 673-0615. E
<b>Studio Apt</b> , 2-bdrm., unfurn., dps., cpts., beam ceilings, disp., pvt. patio, refrig. & stove optional at \$10, adults, \$125 mo. L.A., 756-7990. E
<b>Apt</b> , 2-bdrm., modern, in Torrance, \$180 mo. Newport Bch., 714-646-7605. E
<b>House</b> , 2-bdrm., cpts., stove & refrig., \$95 mo. Compton, 639-8419. E
Rentals Wanted
<b>Family</b> w/2 girls, ages 13 & 6 yrs., want to rent 2 or 3 bdrm. house w/gar. & yard Oct. 1 in Del Amo vicinity. Lawndale, OS 9-4162. E
Child Care Offered
<b>Child Care</b> , close to Northrop, experienced day care by former pediatric nurse, incl. hot meals, Hawthorne, 675-4574. G
Personals
<b>We</b> wish to thank our many friends at Northrop for their kindness & thoughtfulness in the loss of our mother & daughter, Viola Lehto. ARNOLD LEHTO & MRS. NAIMA ELO. L
<b>Dogsitter wanted</b> , 2 or 3 days a week, your home. Inglewood, 671-4339. L
<b>We</b> wish to express our appreciation to our many friends at Norair & Nortronics for their kindness & help in our recent bereavement. MARIAN & JACK COOPER. L
<b>Flying Club</b> , new Cessna 150 Commuters \$7 hr. wet, ILS equipped, full gyro panel, students welcome, qualified flight instructors avail., based at Torrance. Hawthorne, OS 6-6138, DA 5-5288. L
For Sale or Trade
<b>Trail Bike</b> , 1965 Hodaka 90 cc, custom rack & paint, 3 sprockets, \$195 or trade for 160 to 250 cc bike. Redondo Bch., 376-9875. M

## GHOSTS

(Continued from page 2)

now racing in Ghost competition.

Mr. Larsen reasons some 40 Ghosts have now been built and that most are still operating, with distinction, in Southern California.

And Ghosts are still being built.

Norair's Sea Scouts offer a well-rounded program for boys between the ages of 13 and 18 years. Sailing is a major endeavor, as is canoeing and rowing, field trips and general instruction in seamanship, life saving and swimming.

Meetings are held (from 7 to 8:30 p.m.) each Monday at the Hawthorne Naval Reserve Center on 126th Street, one block west of Hawthorne Blvd.

## Flying Object Foiled By Safety Glasses

A "flying object" struck again early this month at Northrop Norair, but thanks to safety glasses no injury was sustained.

James De La Hoz, an aircraft structural mechanic, was assisting a fellow worker in drilling rivet holes in an aft fuselage component for the Boeing 707. The drill bit was deflected by a steel setup bolt and shattered. The drill tip struck Mr. De La Hoz on the right lens of his safety glass, which promptly shattered, but protected his eye.

Mr. De La Hoz is the 84th Northrop Norair employee to become eligible for membership in the "Wise Owl Club of America," a select group of individuals who have escaped possible eye injury through the wearing of safety glasses.

## Square Jets Open New Adult Class

The NRC Square Jets open a new series of adult beginning square dance lessons tomorrow night at Hill Rancho, 15701 Crenshaw Blvd.

Northrop couples may join by attending any of the 8 p.m. sessions each Thursday through October 20. The cost is \$1.25 per lesson.

### For Sale or Trade

**Falcon**, 1961 4-dr. station wagon, deluxe, r/h, w/w, auto. trans., new eng., \$750 or trade for 1/2-ton pickup truck, GMC or Chevrolet. Torrance, DA 5-7705. M

**House**, 4-bdrm., family rm., 2 baths, fenced yd., 1 mile to Research Park, 5 1/2% existing loan, \$39,500 or trade for house in Inglewood-Westchester area. P.V., 377-5172. M

**Sander**, Sunstrand mod. 1000, air-powered, dual pad & spray gun, Binks mod. 7, spare parts, air hose, \$70 or trade for .22 cal. pistol, rifle or shotgun, 16 or 20 ga. Box 1908. M

## Going my way?

### Rides Wanted

7 a.m. — 3:42 p.m.

**City of Orange**, Orange. Wish to get ride with someone who passes through or goes to the city of Orange. L. R. Slininger, Norair, ext. 2105.

**Lampson & Valley View**, Garden Grove. Mike Houlihan, NSL, ext. 1813, 897-6317.

**Pier Ave. & Ford Ave.**, North Redondo. Susan Harrison, Norair



## S. American Drones Near Completion

Northrop Ventura is presently completing contracts totaling nearly half a million dollars to provide drone aircraft and related equipment to two South American nations.

The contracts are with the governments of Brazil and Argentina. Both call for delivery of KD2R-5 unmanned radio-controlled aircraft which have been in standard use as aerial targets for a number of years throughout the Free World for anti-aircraft gunnery and missile training.

"These orders represent Northrop Ventura's first direct sale in the South American market," according to Stiles Burke, head of International Marketing for the Division. "We are mounting a considerable campaign to expand our overseas sales of drones and other equipment to these and other South American nations."

International sales, principally to allied nations in Europe and Asia, have contributed approximately \$2.5 million annually in recent years to Northrop Ventura's volume of business. Strong efforts are being made to expand this market, principally through sale of drones, for target and reconnaissance use, landing systems for space vehicles and aerial cargo delivery.

Both the new South American orders call for manufacture and delivery of drone aircraft along with ground support equipment, spares and field technical support.

The KD2R-5 is a propeller-driven drone 13 feet long with an 11-foot wing span. It is capable of flying for an hour by remote radio control at 200 mph and altitudes up to 23,000 feet.

### Hawaiian Wiggle Due at Clubhouse

Here's a new one for you — a "Hawaiian Wiggle" (Oni, Oni, that is).

Northrop Recreation Club is sponsoring it October 8 at NRC Clubhouse, Hawthorne. Tickets are now on sale at Norair and Nortronics outlets for \$1.50 (per person).

Walt's Melodaires will furnish the music. Dress is either Hawaiian or casual. The hours: 9 p.m. to 1 a.m. A grand door prize will be a trip for two to Hearst Castle.

### VNAF ANTICIPATING ARRIVAL OF F-5'S IN NEAR FUTURE

Prime Minister and Vietnamese Air Force (VNAF) Commander Nguyen Cao Ky announced recently that the VNAF will replace some of the presently assigned A-1 units with F-5 jet fighters "in the near future."

The Prime Minister made the statement during ceremonies at Tan Son Nhut Air Base which honored the 522d Fighter Squadron (VNAF) on their first anniversary.

In his speech, General Ky cited the squadron for their achievements during the past year, but looked to the future by announcing the coming of the more modern and effective F-5. He pointed out that the duties and responsibilities of the VNAF airmen will increase with the arrival of the new more sophisticated jet fighters.

## HAPPINESS IS A WINNER



After three frustrating seasons, Jan Brink, NRC commissioner, and her NRC-sponsored women's softball team emerged as league champions. Girls were feted by NRC Council and received individual trophies from Bob Benedict (right) NRC president at Anaheim. Dramatic playoff victory led to winning of the Anaheim Women's Industrial League crown.

## OPEN HOUSE: Every Person a Host In First Family Tour in a Decade

(Continued from page 1)

In each area displays of products and components will be provided. Some machines will be in operation to illustrate production and assembly techniques. A Hawk missile launcher and loader will perform its intricate tricks, excluding actual missile launch. Office and laboratory areas will feature special attractions.

Of special interest to many will be the underground blockhouse and firing range area of Building Y-7. Northrop Data Processing will demonstrate use of its high-speed computer equipment. Northrop Recreation Clubs will feature their specialties and Deep Submergence personnel are going all out to provide an interesting explanation of undersea programs. Colored brochures outlining the facility and its many product lines will be available. And a special commemorative coin will be presented each visitor.

Free coffee, soft drinks and cookies will be available and music to add to your enjoyment is also being planned as an added feature.

As visitors make their way through the huge facility they

will see components or systems built for the United States Army, Navy, Marine Corps and Air Force as well as for allied nations. They represent a wide assortment of technologies covering land, sea, air and under water applications. They are graphic evidence of the many capabilities and skills found not only at Anaheim, but throughout Northrop Nortronics.

Nortronics Anaheim today is a remarkable contrast to what it was 10 years ago when the first Open House was staged. At that time the entire facility was housed in what is now Building Y-1.

This Open House, above all, affords employees to show their families and friends where they work, what they do and the overall contributions they and their fellow workers are making toward the advancement of technologies in many fields.

You can do your part by turning in the number of people in your party to Industrial Relations using the blue cards provided at Anaheim and the yellow cards distributed at Newbury Park, Palos Verdes and Hawthorne.

## NORAIID Re-elects Board; John Richardson Elevated

Northrop Corporation's NORAIID board of directors this month elevated John Richardson to a new post as chairman and at the same time returned him to office as president of NORAIID.

In taking over the new dual responsibilities of office in the Northrop in-plant charity organization, Mr. Richardson succeeds as chairman, George Gore, Northrop vice president—general counsel and secretary, who has served nine consecutive terms as chairman of the NORAIID board in his 11 years as a NORAIID director. Mr. Gore will continue to serve on the board of directors.

Mr. Richardson, chief of Personnel and Compensation at Norair, now heads a board which includes as members, Mr. Gore and C. C. Cilley of the Corporate office; Lloyd Balsam and Elmer Noonan of Nortronics; Paul Crews, Don Grothe, Jack Mannion, J. D. Matthews and Ben Trump of Norair. All board members are holdovers from the 1965-66 board.

The all-important NORAIID committees that serve as advisory groups for the board of directors at divisions and off-site locations will be made up of the following members during 1966-67:

The Hawthorne committee: R. B. Scott, chairman; Isabelle Ainge, Tom Brazil, George Forbes, Larry Long, Ed Nolan, R. W. Robinson, Jo Roth and Hazel Salmon.

The Anaheim committee: Harry Belcher, chairman; William Carey, Don Taylor and Sally Willsey.

The Johnson Facility / Palos Verdes committee: Harry Clark, chairman; Donald Weaver, Floyd Jones, Dorothy Baldwin, Frank Morehouse, Jean Schaefer and Roland Gagon.

The Edwards Air Force Base

### Bavarian Theme Set for Halloween

The spooks and hobgoblins will run wild, in Bavarian costumes, no less, October 15 when NRC at Nortronics Anaheim stages a Halloween Bavarian Dance at NRC Clubhouse, Fullerton.

Admission will be \$1 per person. Refreshments, including the liquid type, will be an additional \$1. They are available through NRC.

There will be prizes for the best and funniest costumes.

The Tune Launchers will play for dancing.

## TRAINING

(Continued from page 1)

Products department at Norwood, Massachusetts; and regional offices in Washington, D.C., San Bernardino and Dayton.

Incentive awards — ranging from a golf cart to an electric razor — were offered during the course for the most astute participation, Mr. Bray said. These were won by: Len Baker, Herb Bansbach, Ken Barlow, Denny Bates, Gene Courtier, Pete Leibert, Frank Morehouse, Ev Nelson, Bob Rodgers, Dan Sabolos, and Dick Vahlstrom.

Evaluation of the course by participants was nearly 100 percent favorable.

"For those students who are correctly sales-oriented to begin with, the course only strengthened the convictions and principles they are now applying. For those students who have not had experience in the sales process, this was undoubtedly a very enlightening course," an engineer said.

Another engineer pointed out: "The role of the engineer as a part of the selling team has never been so clearly illustrated."

From a marketing specialist came this comment: "It helped to re-establish certain values as to the importance and rules of marketing."

An applications engineer commented: "It was four days of positive teaching during which my interest was always on a high key. No boredom during the entire presentation and participation."

## SEEKER

(Continued from page 1)

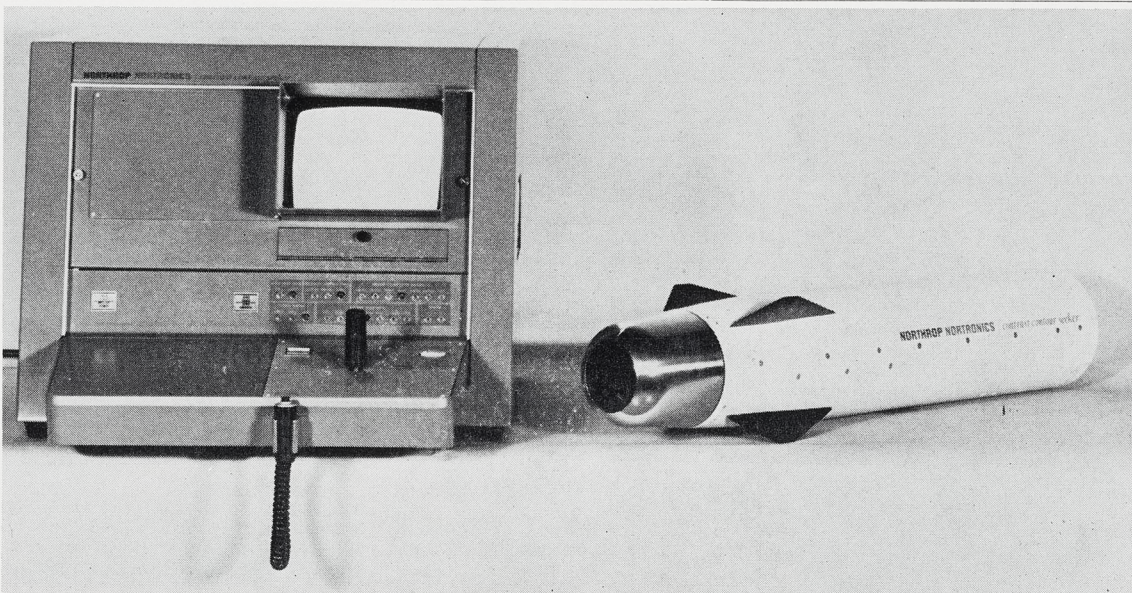
other applications, such as spacecraft and satellites, the Nortronics system is the first to be sophisticated enough to retransmit pictures for reception in home receivers.

"The contour contrast seeker has contributed a great deal to our understanding of tracking extended targets (those beyond limiting resolution of the tracking system) and has led to invaluable insights which will lead to better systems," Mr. Lane said.

Terminal guidance systems for missiles is now a third major area of concentration within the Tracking unit, joining daytime star trackers (various navigation and guidance applications) and range instrumentation (primarily the Airborne Lightweight Optical Tracking System, or ALOTS, developed for the Air Force).

The contour contrast seeker was originally designed for helicopter-launched anti-tank missiles, but presently is being considered for air defense missiles and to provide data for bombing computers.

The NRC Bridge Club at Nortronics Anaheim is now featuring a senior game each Thursday night (at 7:15 p.m.) during regular sessions held at NRC Clubhouse, Fullerton.



EYE OF MISSILE—Northrop Nortronics terminal guidance system, called a "contour contrast seeker," has been successfully tested by U.S. Army Missile Command. Miniature

television camera is mounted in missile head (right), while control console is at left.



# NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California

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October 12, 1966

## Jones Cites Opportunity For Growth

"Northrop's outlook today is clearly one of growth," Northrop President Thomas V. Jones told Norair Management Club members last week. "Not that it is inevitable or that it will come automatically, but the opportunity is there if we make the most of it."

Mr. Jones was principal speaker Friday evening, at the October dinner meeting of the Club at the Airport Marina Hotel.

"We have a backlog of \$574 million now. In it are programs that still have a lot of growth in them. These, together with foreseeable opportunities for new contracts, make up a very meaningful possibility of significant growth within the framework of our present business," Northrop's chief executive said.

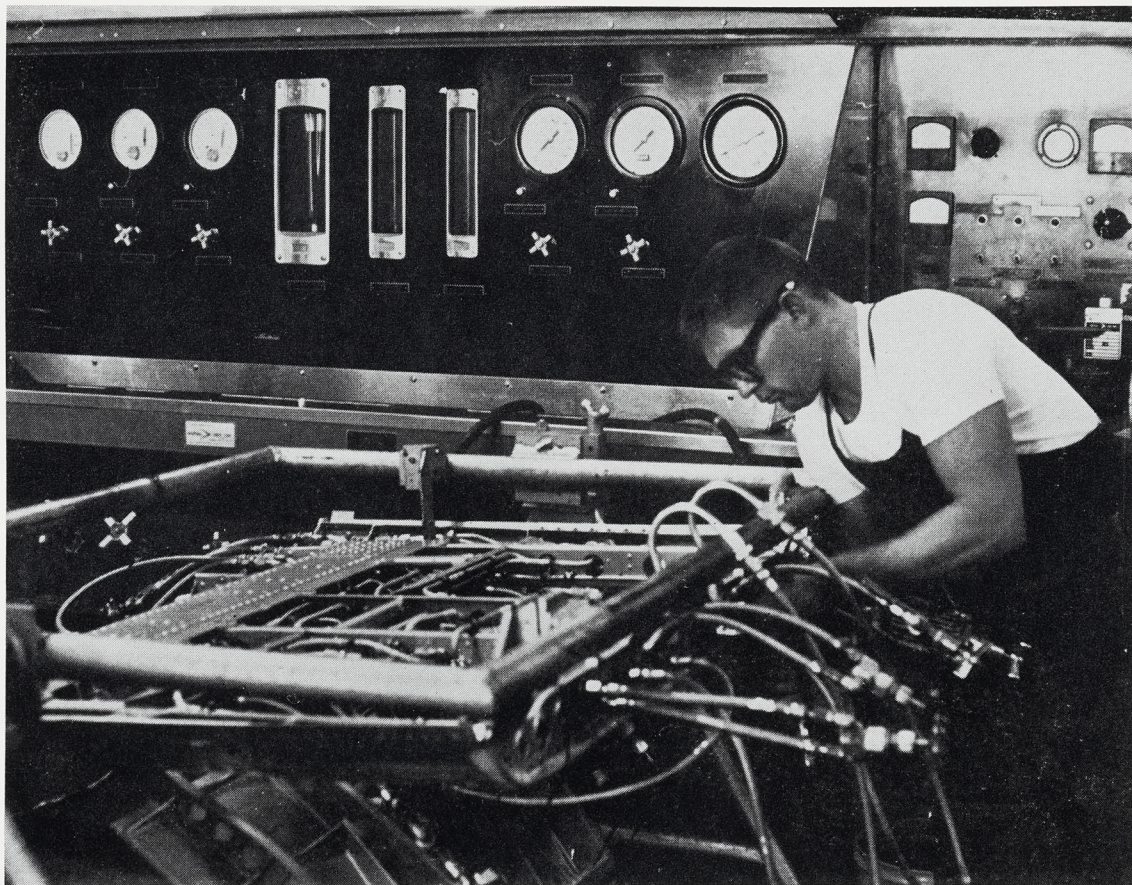
"On top of that we have for some time been working on a program to acquire other businesses that will complement our present corporate makeup and broaden the range of our activities to include a great deal more than that of an industrial and commercial character.

"Rapid growth which is not accompanied by sound corporate control can get out of hand," Mr. Jones warned. "At that point growth ceases to be an asset and becomes a liability. A billion dollars in backlog can mean the potential of larger earnings or it can mean the danger of losses.

"Effective management procedures are essential to assure that a big backlog will lead to profits," Mr. Jones said. "Cost reduction is important," he said, "but it must contribute to company profitability.

"Earnings are the key to growth and greater opportunity," the chief executive said. "Right now 60 percent of the company's earnings come right back to provide the assets we use every day, assets like the new transport building at Hawthorne, our (See TALK, page 6)

## SPEED BRAKE SPECIALIST



Nortronics Anaheim has concentrated its aircraft production activities in new quarters in Building Y-12. Typical of work under way there is this T-38 speed brake operation being performed by George A. Gullett. Mr. Gullett has in-

stalled hydraulic lines on speed brake and is preparing to hook them to hydraulic test unit in background for thorough pressure test routine.

## Patent Symposium Draws 150 at PPD

An estimated 150 Northrop engineers and inventors participated last week in a symposium on patent disclosures in Norwood, Massachusetts.

The men were from the Northrop Nortronics Precision Products department, in Norwood.

Willard M. Graham, Corporate patent director, was chairman.

The men discussed new ideas for inventions, procedures for filing patent disclosures, application for patents, and the problems involved in establishing conception dates of ideas.

The meeting was held on October 4.

## Service Awards Presented To 59 Veteran Employees

Fifty-nine Northrop Nortronics employees were honored for long service during July and August during service pin presentations.

Four employees received 20-year pins, 35 received 15-year emblems, and 20 were awarded 10-year pins.

The 20-year pins went to Robert Philbrick, Stanley Baker Jr., Bertrum Shearer and Glenn Landes.

Earning 15-year emblems were William Kelley, James Ricketts, Leo Guolo, James Alexander, Frederick Brown, Olive Maillet, Hazel Bullion, George Tomblin, Stanton Collins, Marqua DeGonia, Dalma Sanzaro, Alice Williams, William Willis, Henri-

etta Horner, Robert Corson, William Phillips, Frank Kalus, Wesley Toy and David Belcher.

Also Floyd Cayer, James Crawford, Ralph Vincent Jr., Richard DeFussi, Harold Tracey, Lois Akers, John Maesule, Carl Goodwin, Juan Espinoza, Edward Horgan, Robert Little, Kenneth Laverty, Louis Proctor, Bert Swearing, Stephen Zemba and Robert Bacon.

Ten-year service pins went to Donald Smith, Gerald Duryee, Joe Luckey, Ralph Cornwell Jr., Dorothy Penner, Jack Paulin, Robert Hockenberry, Stephan Sanders Jr., Jack Graham, Norman Quan, Davis Bourgoine, Leonard Shook Jr., Edward Edukas, Hidimi Miyahara, Ward Cayot, Donald Mealy, Paul Lester Jr., John Iwatsuric, Una Murray and John Humphreys.

## 5600 Attend Open House At Anaheim

More than 5600 persons turned out last Sunday to take part in an Open House observance held at Nortronics Anaheim.

Among the guests were representatives of all Nortronics West Coast facilities—Anaheim, Hawthorne, Palos Verdes and Newbury Park.

There were also guests representing other Northrop installations, including the Corporate office.

But the principal guests were Nortronics employees and members of their families, plus any friends they cared to bring along. For the most part, family groups seemed to outnumber all others there.

The first guests showed up well before the 1 p.m. starting time and waited patiently for the gates to open. And the last guests departed well after the 4 p.m. closing time.

This was the first open house held at Anaheim in 10 years.

It afforded many old friends now working at scattered points an opportunity to meet again.

Above all, it gave the employee a chance to show members of his family where he works and the many products being turned out for a variety of customers at Anaheim. There was also occasion for meeting fellow employees and their families.

Special consideration was given to individual desires in this Open House. There were no established tour routes, no guides and few limitations. Only a small area, presently under renovation, was closed for the Open House. Guests were free to move about at their own pace, to visit points of interest to them and to remain as long as they desired at each point.

Each family entering the plant was presented a brochure covering Nortronics Anaheim's history, product lines and a special word of welcome from Frank Lynch, Nortronics vice president and manager of Operations. There was also a map of major (See OPEN HOUSE, page 6)

## 10,000 HOURS LOGGED

## Severson Completes Cycle as Pilot

Martin A. "Sevie" Severson is a modest man who would have you believe there is little of interest in the fact he's completed a circle as a pilot—from trainers in 1930 to today's small pleasure aircraft.

There are "several" men now employed by Northrop Corporation with the same distinction, he will have you know.

But press the Nortronics Marketing staff member a little and you come up with some very interesting facts.

From 1930, when he entered the military service as a Naval aviator with the U.S. Marine Corps, until he retired in 1959 as a brigadier general, Mr. Severson was a pilot on the go.

He logged more than 10,000 hours as a pilot, including 1000

hours in jets and 500 in helicopters. He flew every fighter, fighter-bomber and helicopter utilized during the period by the Marines.

Mr. Severson is an acknowledged authority on night fighter operations and helped pioneer tactics in this field.

He flew 150 combat missions during World War II and Korea, many in direct support of ground forces.

Mr. Severson was one of the very few Marine Corps pilots to fly with the United States Army Air Corps in Europe in World War II.

And he was executive officer of a Marine Corps air group sent to China to accept the Japanese surrender there.

After graduating from Carleton College, Minnesota, in 1930, Mr.

Severson became a Reserve Student Officer, earning his Naval aviator's wings and then flying one year before being released from active duty in 1932.

He became a co-pilot with Hanford Airlines and flew Fokker and Ford Tri-Motor aircraft along a route connecting Winnipeg, Canada, and Chicago.

Co-pilots were, at that time, jacks - of - all - trades; stewards, mail handlers, passenger agents and armed guards (required for handling mail), Mr. Severson said.

"I was on a night flight from St. Paul to Chicago," Mr. Severson added. "I made one leg of the trip, grabbed a little sleep in the airplane, and flew back."

Only "primitive" instruments were available and few naviga-

(See PILOT, page 6)



THE PASSING YEARS—Frank W. Lynch, Nortronics vice president and manager of Operations (right), was host recently to four employees observing completion of their 20th year with Northrop. Receiving 20-year pins were, from left, Glenn Landes, Bert Shearer, Isabel Walker and Bob Philbrick.



## HENDERSENS' GIVE IT LIFE

## Private Ghost Town Full of 'Dead Soldiers'

Not many people start collecting old bottles and wind up with their own ghost town.

Hal Hendersen and his family did.

Now the Hendersens are the sole owners, residents, operators and promoters of "Iona City" in Canoga Park. It occupies part of a one-acre plot behind the Hendersen home.

(Mrs. Hendersen's name is Iona. The name combination is a paraphrase—I own a city—that tickles the Hendersens' fancy.)

Money can't buy admission to "Iona City." Interest will.

Interest, that is, in the study and preservation of 19th Century gold and silver mining camps that flourished, that died, in the west. Most are now ghost towns.

But about those bottles, the starting point.

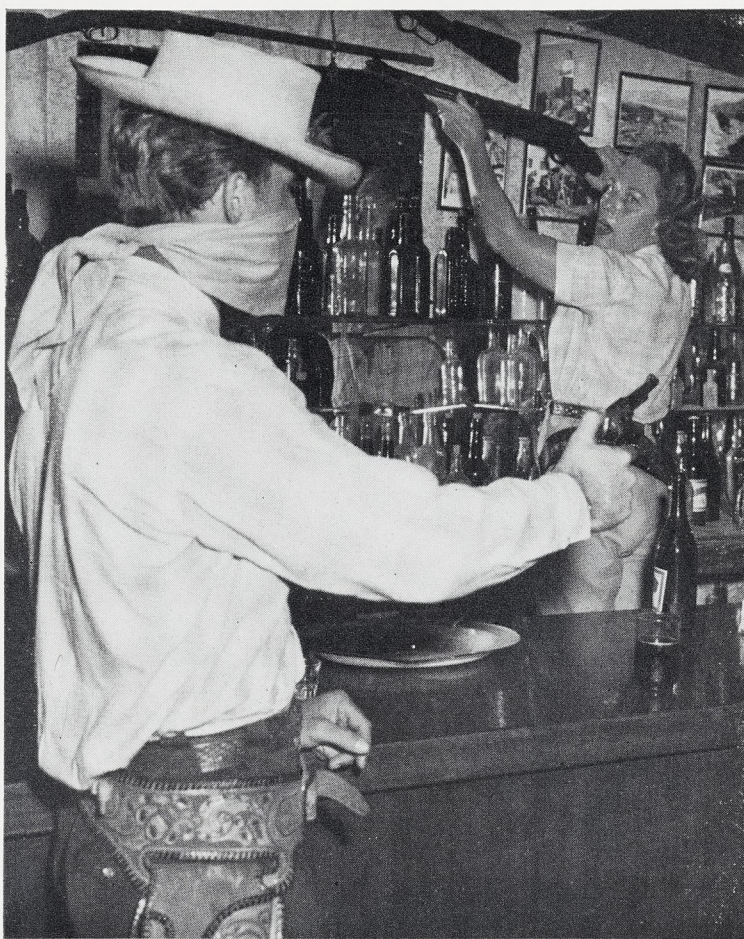
Mr. Hendersen, a process analyst in Quality Control Engineering (Critical Parts Control group) at Northrop Norair, his wife and daughter, Carole, and granddaughter, Lisa, are long time rockhounds and desert lovers.

They began noticing old bottles, aged and colored by sun, years ago. They brought a few home, then a few more. Soon all available storage space was filled, with bottles.

So the family ripped out the back of a two-car garage and extended it as a showcase for their bottles. It was dubbed the "Hard Cash Saloon." Other relics were added—a bar, a potbellied stove, an old mining safe, pictures, guns—until the place looked just like a western saloon. Sawdust was added to the floor.

"This project broadened our interest and led us to seek other artifacts," Mr. Hendersen said. "Ghost towns became the objective for our weekend trips, salvaging our goal."

Employed then (about four years ago) at North American Aviation in Canoga Park, Mr.



**HOWDY PAHDNER**—Iona Hendersen, co-proprietor of Canoga Park ghost town saloon, prepares to defend invaluable bottle collection, which Hendersen family has been amassing for years.

Hendersen fell to discussing his trips with fellow employees and uncovered shared interests. This led to the formation of a Ghost Town Club. It now has a membership of 35 units (each unit is a family).

Meeting twice each month and conducting field trips once a month, the group works diligently to promote the preservation and restoration of this era of history. They took a very active role leading to the establishment of the town of Bodie as an historic site, protected by law.

"Salvaging for restoration is quite different from outright vandalism," Mr. Hendersen said. "We are working against vandals, and

time, to recreate this era for future generations to know and understand."

Although towns with names like Pioneer, Goldpoint, Silverpeak, Blair, Thorpe, Masonic, Ivanpau, Panamint City and Cerro-Gordo appear on few maps, they are well known to ghost town lovers.

From these towns and others like them have come items to add to "Iona City"—blacksmith tools, ore buckets, mine carts, wagon wheels and springs, old stoves and other relics.

After the "Hard Cash" was completed, the Hendersens added an office-display room for bottles and harness making gear. A stove

and iron works followed. Then a brewery (bottles again) was recreated. A tumbled-down miner's hut, made of block, lends an air of authenticity to the layout. A hay barn is both decorative and functional—it holds feed for the burro, goat and ducks who call "Iona City" home.

False-front buildings are replicas of a hotel, jail and mining equipment store, each with its share of artifacts.

Behind all this is "La Mina Perdido del Lagarto Rojo" (The Lost Red Lizard Mine). It is laid out like an old gold mine with tracks, carts, excavating tools, the works. (It is also used to produce sand and gravel for building projects.)

Much of the lumber and other building material used was obtained from old buildings being demolished. The Hendersens did all the construction work themselves.

Careful records are kept of each relic, especially those given by others. They contain information as to the origin, location and possible use of the item.

Other files contain maps, literature and personal data compiled on the many known, and some unknown, ghost town sites.

Mr. Hendersen and his friends laugh at their perchance for excavating old city dumps, the locale of many of their most cherished finds.

"A dump reveals a great deal about the character of the town it served," Mr. Hendersen explained.

Shallow, poorly covered dump areas with many liquor and meat sauce bottles means the camp was probably frequented by men. Well dug and covered dumps containing medicine bottles and household items, in contrast, means families lived in the camp.

While "Iona City" has given the Hendersens a new prospect

(See **BOTTLES**, page 4)

## Presbyterians Tab Morris Plotkin as 1966 Man of Year

Morris Plotkin, Corporate director of Industrial Planning, has been named 1966 United Presbyterian Churchman of the Year for Southern California.

Mr. Plotkin, a member of the Covenant Presbyterian Church in Los Angeles, received the honor on September 24 at the annual Presbyterian Men's meeting. More than 1000 men attended.

"The whole thing was a surprise to me," Mr. Plotkin said. "I was sitting there, listening to the speaker, when he started talking about someone. Then I realized I was the one he was talking about."



Mr. Plotkin

In a citation read by Robert Hermanson, associate executive secretary of the Synod of California, Southern area, Mr. Plotkin was described as "one of those rare churchmen who grasp and incarnate the real meaning of laity . . . Ministry for him is a profession of faith, and not a province for professionals. Shared by each, it signifies the proper implementing, by all, of the church's mission in the world."

He is ruling elder of Covenant Presbyterian Church, and has been a member of the session for three terms.

He has also served the denomination at regional and national levels.

## Millikan Appointed To Policy Committee

Brigadier General Willard W. Millikan, senior eastern representative of Northrop Norair, has been appointed to the Air Reserve Forces Policy Committee.

General Millikan is commander of the District of Columbia Air National Guard's 113th Tactical Fighter Wing, based in Washington.

He has been in the Air National Guard for 20 years, and has more than 3000 jet fighter flying hours. He, his wife and one child live in Alexandria, Virginia.

## Premiere Tickets Still on Sale by NRC

Choice reserved seats are still available for the October 25 premiere showing of the motion picture "Hawaii" that has been reserved exclusively for Northrop employees and their guests.

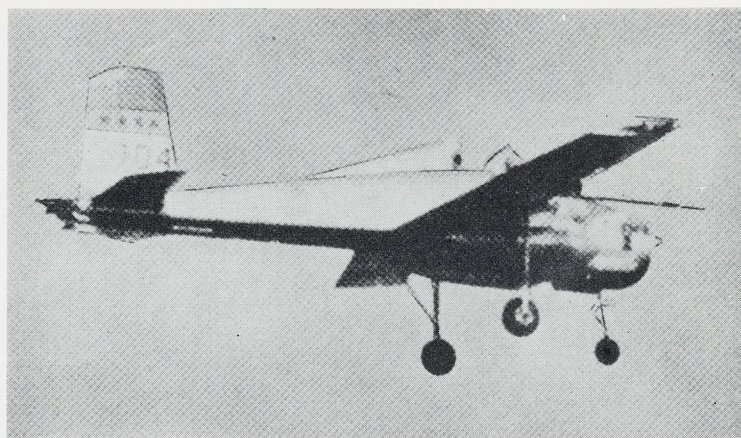
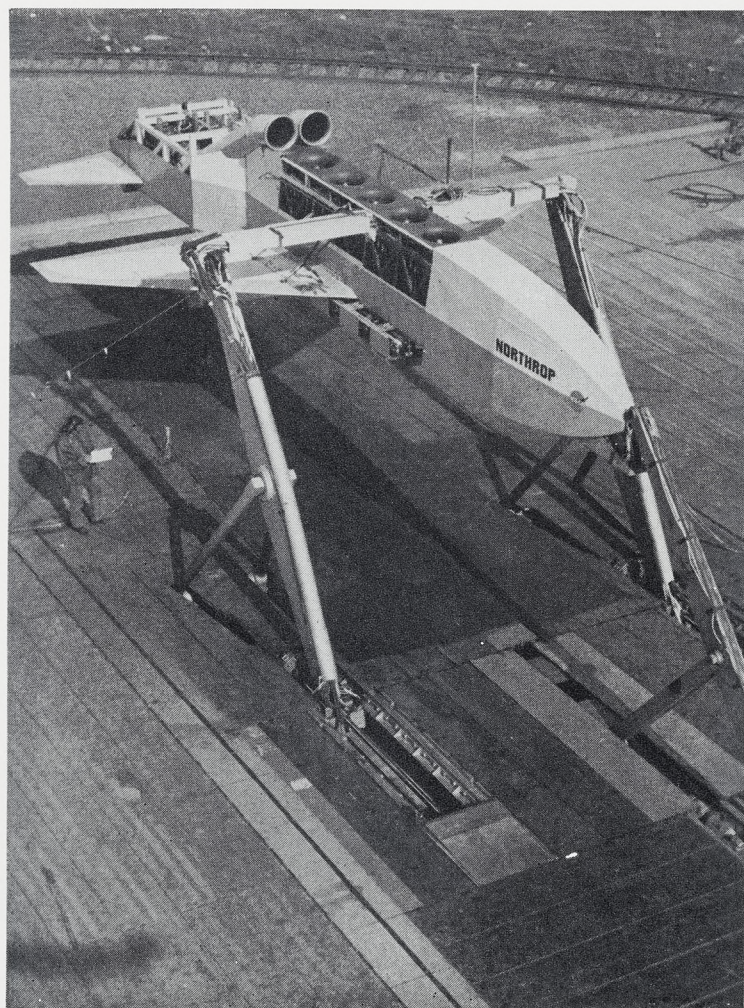
This performance, one of a series of pre-release theatre parties, precedes normal public showings of the epic based on James A. Michener's greatest novel. It stars Julie Andrews, Max Von Sydow and Richard Harris.

By "buying the house," NRC Councils are able to offer reserved seats at a reduction of 50 cents each to Northrop folk. Which means prices (to Northrop participants) are \$3, \$2.50 and \$2.25.

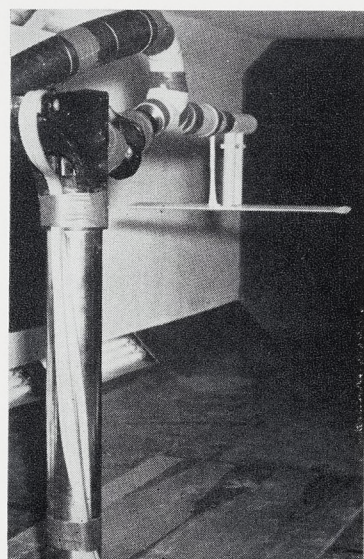
Tickets may be obtained at all Northrop ticket outlets.

The performance is at 8:30 p.m. at the Egyptian Theatre, Hollywood.

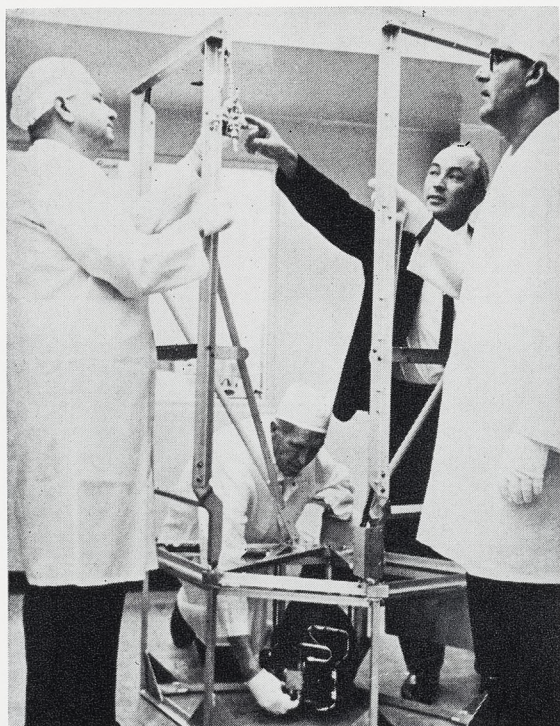
## TECHNOLOGY FOR JET V/STOL DESIGN



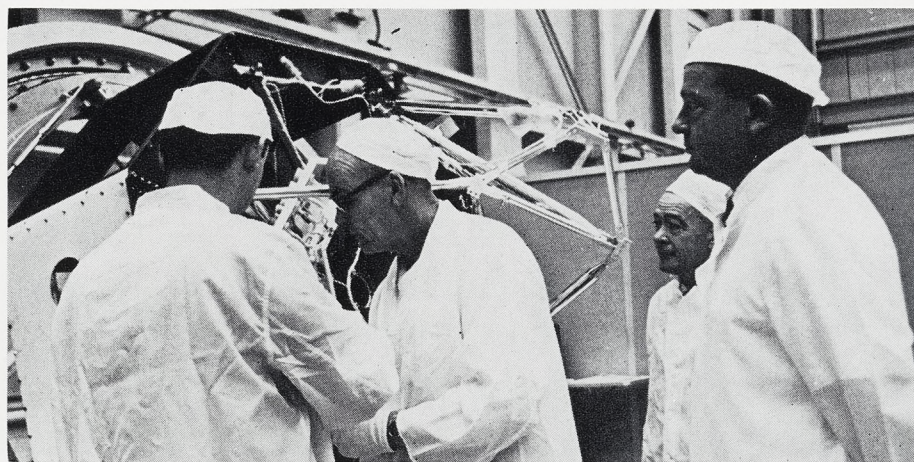
Representative of Northrop's eight-year effort in building technological base for jet V/STOL fighters are: Left—Test vehicle used by Northrop at NASA Ames Research Center to study the influence of hot gas ingestion and jet effects for various Norair VTOL configurations. Above—X-14A, a Navy test vehicle, hovers during flight test. Northrop developed all-mechanical primary flight control system which was demonstrated during this test series. Right—Wind tunnel test of wing and jets to measure jet effect on lift was part of experimental and theoretical work undertaken to predict aerodynamic forces on jet lift aircraft during transition from thrust-borne to wing-borne flight. Earlier this month, NASA's Langley Research Center awarded Northrop a contract for complete design of a jet V/STOL aircraft (story on page 1).



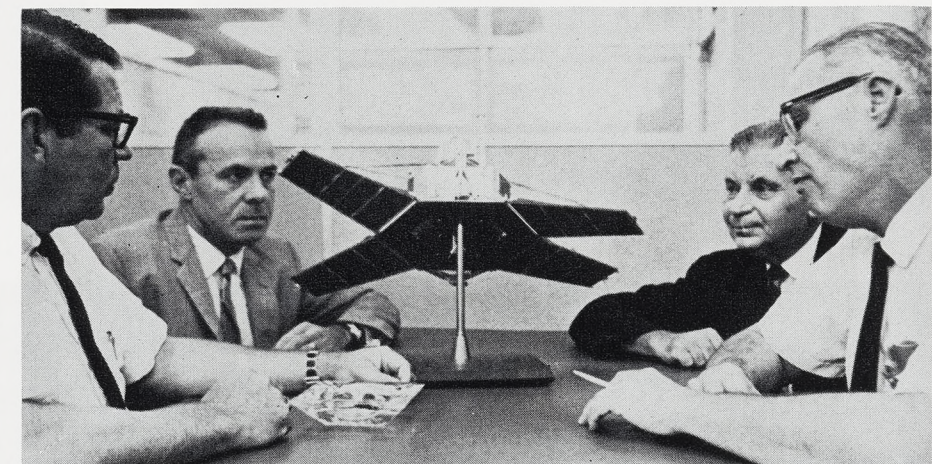
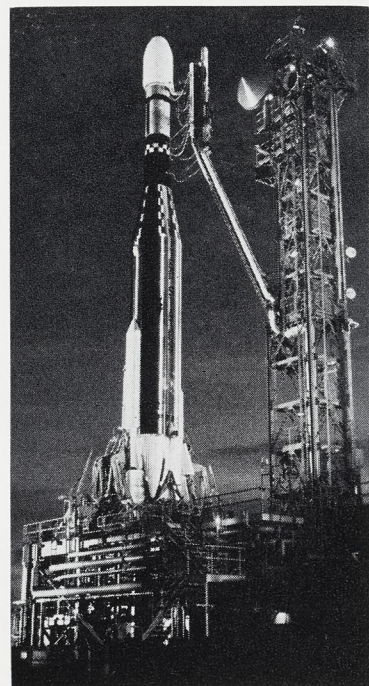




Clay Enoch (kneeling) of Northrop is engrossed in subassembly for Mariner '67 along with (from left) C. E. McKewn, E. F. Koch and George Courville, all of JPL. Below, Dorothy Herzstein, computer programmer, and Bob Maulsby, engineering specialist, analyze data on Mariner '69 telecommunication system effectiveness.



Northrop employees assigned to Jet Propulsion Laboratory are engaged in numerous activities, including: Left—Chuck Fuller (standing), cognizant engineer for development of a sensor which will activate Mariner Venus systems as it nears planet, and Larry Conley. Above—Tom Laney and JPL Test Director Wade Earle watch installation of component on Mariner Venus. Below—Future Missions planners (from left) Ken Fishback of JPL, Bob Rubinstein, Vic Farel and John Meyer of Northrop. Right—Mariner IV poised on launching pad at Kennedy Space Center.



## SPACE EXPLORATION

# Sharing in a Great Human Endeavor

Sharing in what is probably the most outstanding human endeavor in the history of mankind is one of the greatest feelings a man can experience, says Bob Rubinstein, an advanced space systems engineer at Northrop Space Laboratories.

That endeavor is the exploration of our solar system, and Mr. Rubinstein is one of 48 Northrop technical specialists currently assigned to Jet Propulsion Laboratory at Pasadena where Northrop's Support Operations is providing technical assistance to NASA lunar and planetary missions.

As its literature says, "JPL is a world of its own—a space world where fantastic fancies have been turned into fact, and top technological minds are delving into the shape of future exploits in space."

The scientific climate and the spirit of discovery is almost overpowering, and all of Northrop's engineers and scientists—whether they have been at JPL two days or two years—speak pretty much in the same vein as Mr. Rubinstein.

Northrop specialists at JPL do not work as a team but rather are absorbed throughout the spectrum of the Laboratory's activities. In their functional roles, they report to JPL supervisors. Within Northrop's Support Operations organizational structure they report to Alan Kidd, program manager on the current support contract.

"We are extremely pleased," Mr. Kidd says, "at the opportunity to apply our technological know-how to these significant space programs, while at the same time enhancing our knowledge and skills by working with one

of the most outstanding space teams in the nation."

While some of the Northrop people are presently rushing to meet a flight schedule for another Surveyor soft landing on the moon, others are looking as far ahead as 1990 to as yet unnamed planetary explorations. In between are Mariner '67 (Venus), Mariner '69 (Mars), and Voyager '73 (Mars).

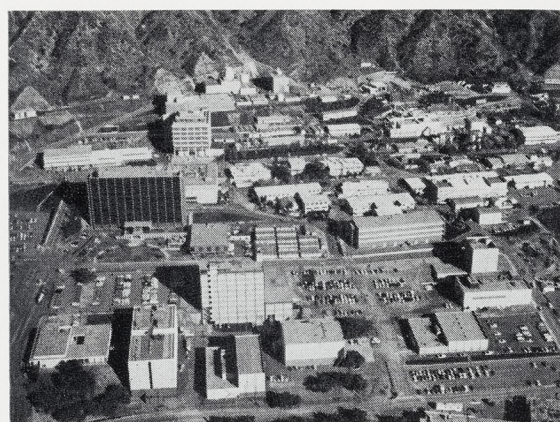
(Technical support of the Mariner Mars mission should not be confused with a separate \$5 million contract awarded Northrop Space Laboratories by JPL for NASA for development and fabrication of spacecraft mechanical systems.)

Vic Farel, with extensive experience in systems engineering and program management for satellite communication systems, is engaged in telecommunication systems engineering and equipment design for the Voyager program.

While the assembly of spacecraft hardware for Mariner '69 is a couple of years away, the JPL Systems Design and Integration section is already putting the pieces together on paper. Supporting preliminary system design for the spacecraft are Gunther Kallman, Don McLain, Bob Moyer, Harvey Sellner and John Spaulding. Principal activities supported are interface definition and control, system integration, weight and inertia control and configuration management.

Telecommunications and computer programming occupy several Northrop specialists. In the Systems Analysis section, Sun Wong analyzes the antenna tracking

(See SPACE, page 4)



Center of JPL complex in the San Gabriel foothills.

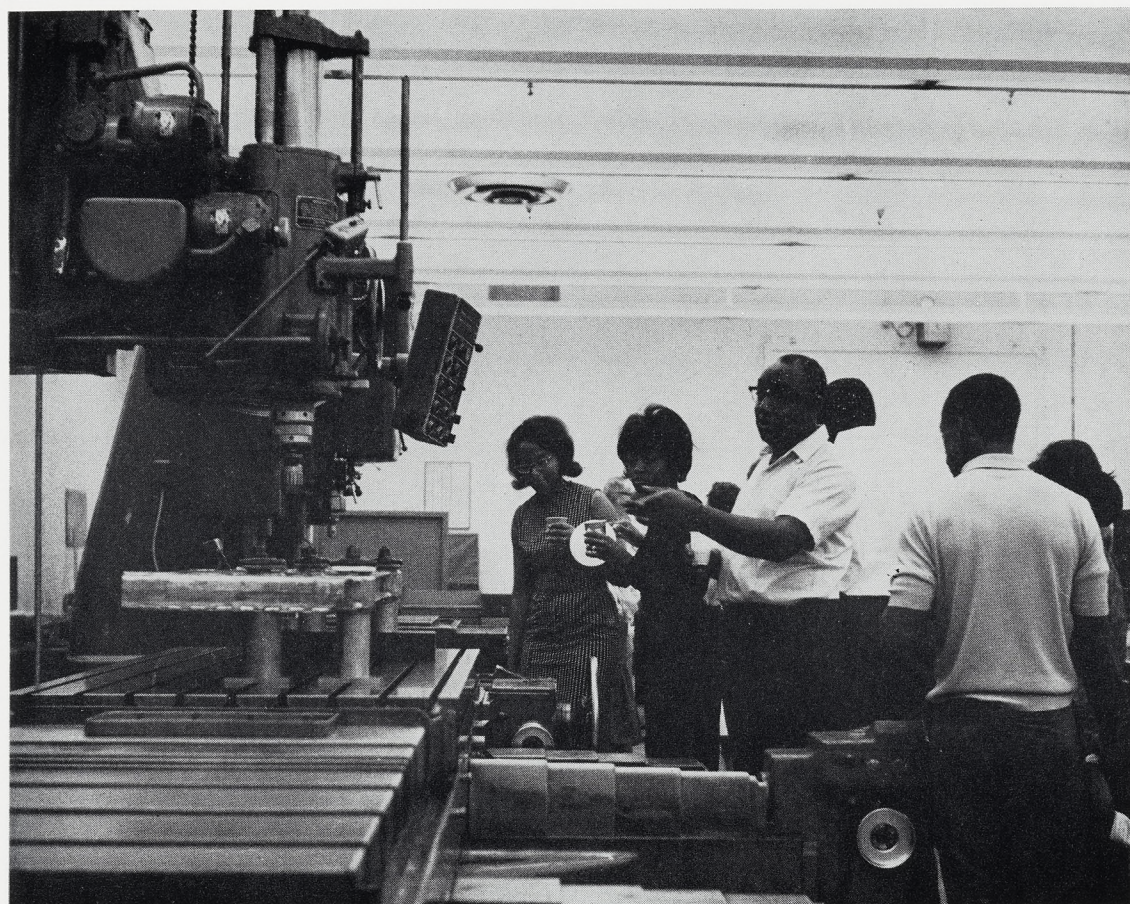


Supporting Mariner '69 in Systems Design and Integration section are five Northrop specialists pictured above with their supervisors. From left are Harvey Sellner, John Spaulding, Fred Smith (JPL), Bob Moyer, Don McLain, E. L. Royal (JPL), and Gunther Kallman.



Bud Ulf, office manager and engineering coordinator for Northrop at JPL, chats with receptionists in lobby, which is first stop for all new Northrop employees at JPL. Receptionists are (from left) Nancy Hewitt, Mary Hite and Vickie Westphal.



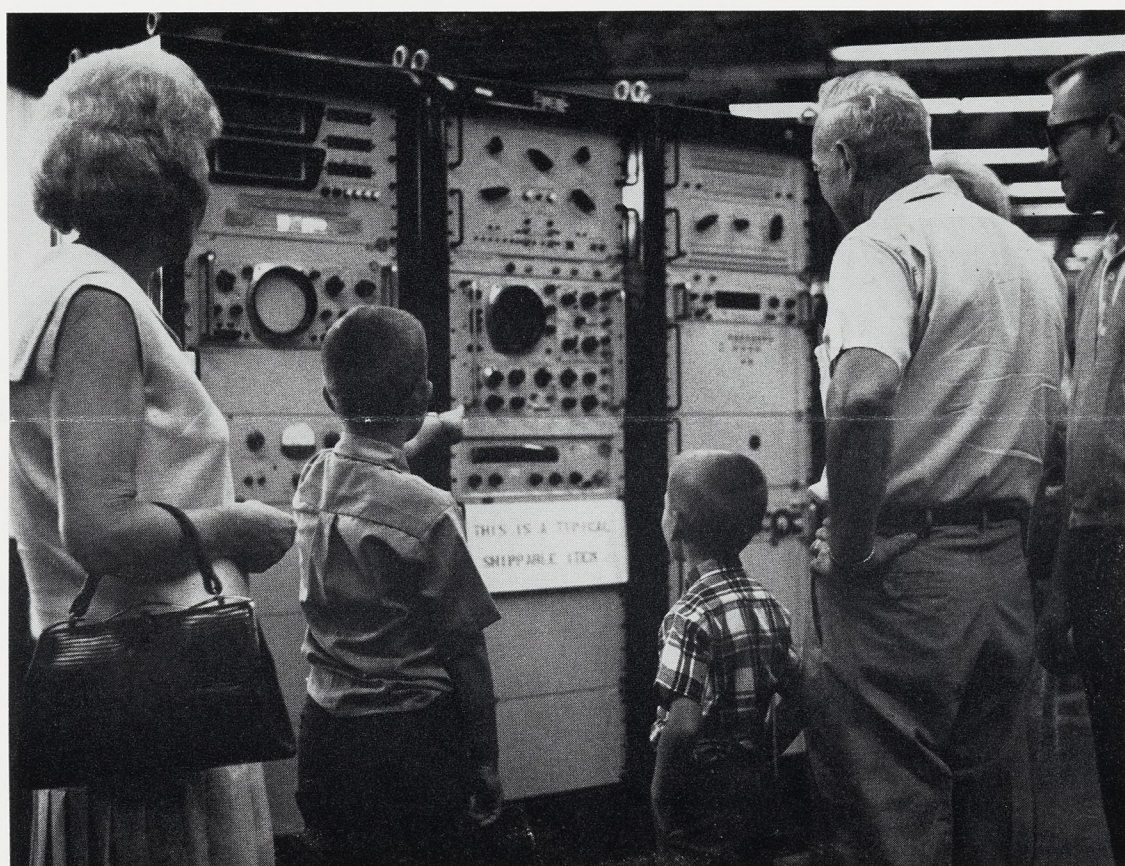


# Families Look Behind the

## Open House Attracts 5600, Features Pr



An Anaheim scrapbook claims the attention of Northrop senior vice president, Mrs. Nolan and R. Open House chairman, explains card sorter to game heads form a part of NRC Archery Club



An automatic test equipment unit stands completed and ready for shipment (right) as part of one display. And world map with appropriately marked F-5 fighter models show where F-5s are now deployed along with some of the parts manufactured for the F-5 at Anaheim (below). And a visiting family (above) takes a close look at a production machine.



Young lady is interested in host's description of factory and out of two levels of ordnance test site (left below)

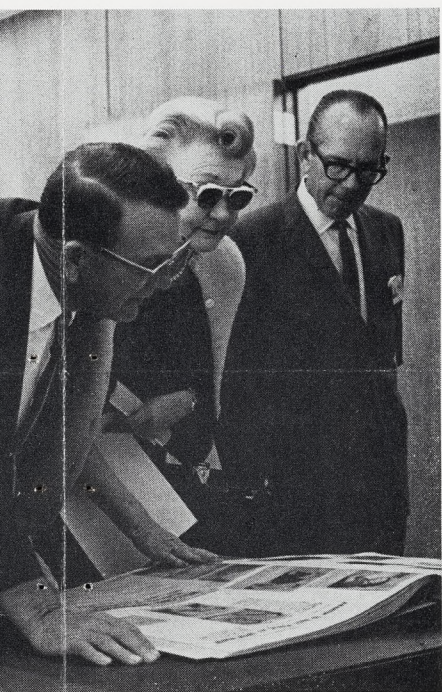




# and the Scenes at Anaheim ures Products, Demonstrations, Displays



Attention of Frank Lynch, Richard Nolan, Nor-  
s. Nolan and R. L. Gibney (below). E. T. Jessick,  
card sorter to family (right above). And mounted  
C Archery Club exhibit (left above).



tion of factory tool (right below). And families stream in  
ite (left below) open for the first time to public.



Anaheim's Western High School Band provided lively music  
throughout Open House (left) and drew rapt attention of  
this family. Cutaway model of Boeing 707 airliner allows



this family (right) to see seating arrangement. Northrop  
has built parts for all 707 airliners as well as KC-135  
military transports and tankers.

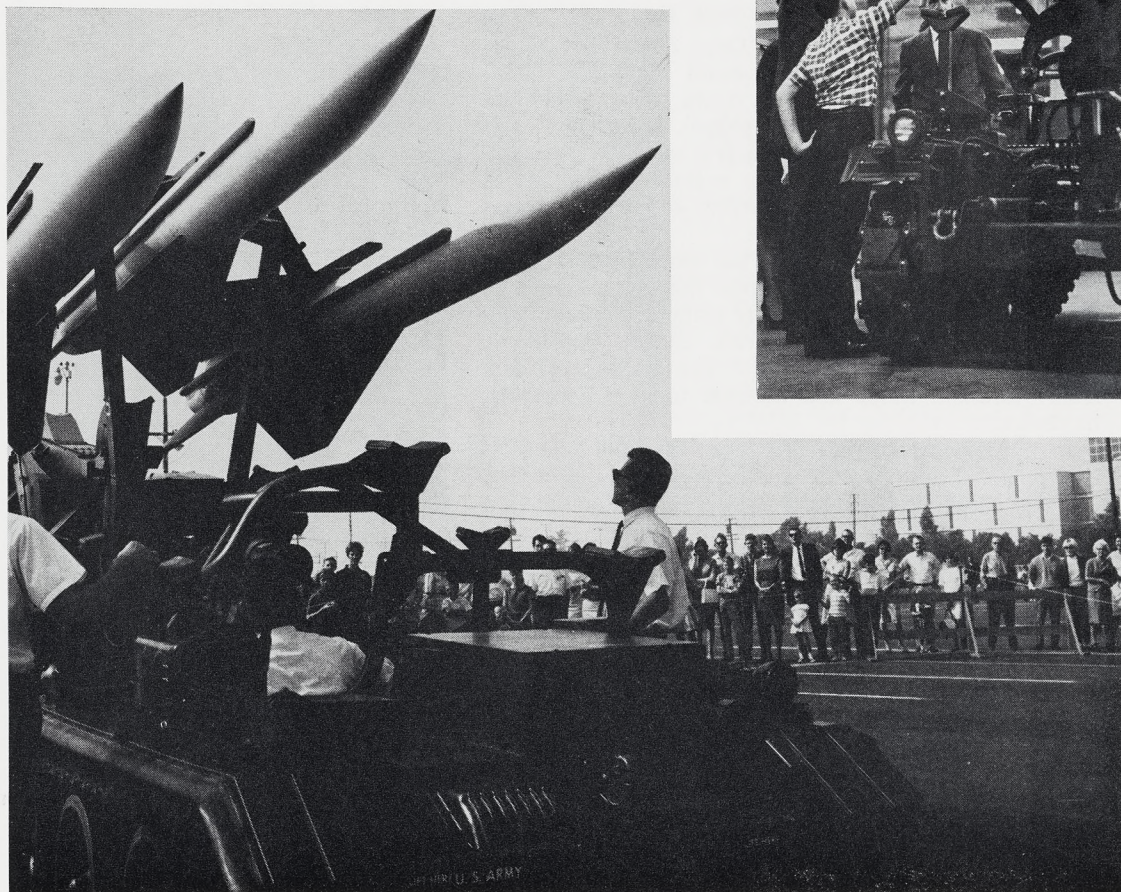
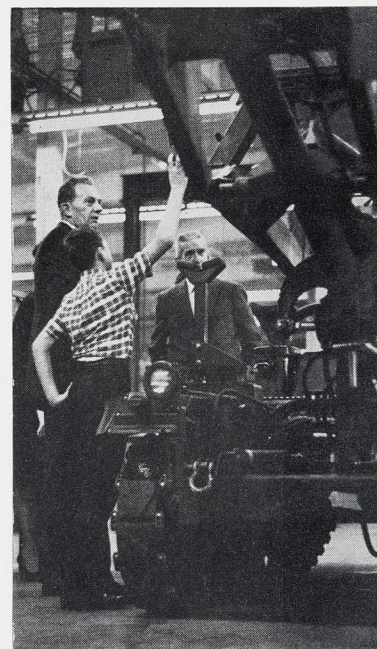


A frogman, dressed for the occasion,  
presents information to young visitors  
(above). Man was part of an interest-  
ing Deep Submergence Systems Pro-  
gram display.

Photography by  
Amador Acosta,  
Wally Browne,  
and  
Roy O'Brien



Hawk missile launchers and loaders were special favorites of crowd. Young  
lady (above) fingers controls and imagines deeds of valor. Host explains  
loader operation (right) to young boy and his father. And a loader (below)  
shows watching crowd how modern missile systems are handled by posi-  
tioning battery of missiles aboard launcher.





## AD ASTRA PER ASPERA

## International Award Won By Lifting Body Test Pilot

Milton O. Thompson has received the 1966 Ivan C. Kincheloe Award as the world's outstanding experimental test pilot of the year.

The award, presented by the international Society of Experimental Test Pilots (SETP), was given "in recognition of outstanding professional accomplishment in the flight testing" of the Northrop-built M2-F2 lifting body.



Mr. Stanley

Mr. Thompson is chief lifting body project pilot for NASA's Flight Research Center.

Vice President Hubert H. Humphrey presented the Kincheloe Trophy to Mr. Thompson in private ceremonies held in Washington, D.C.

Films of this presentation were shown at the SETP's 10th Symposium and Banquet held late last month in Beverly Hills.

General chairman of this affair, the 10th annual "Report to the Aerospace Profession," was Max R. Stanley, Northrop Norair's chief of Flight Support Operations and a charter SETP Fellow.

Taking part were representatives of many nations who make up the 860-member organization.

The Kincheloe Award, named for the late Captain Ivan C. Kincheloe, a former Air Force test pilot who was scheduled to be chief of flight operations for the X-15 before he lost his life in an aircraft accident, is presented once each year in recognition of outstanding

professional accomplishment in the conducting of flight tests.

Mr. Thompson early this year made the first flight in the Northrop-built M2-F2 lifting body, the world's first all-metal vehicle now being used to establish technology needed for the design of future spacecraft capable of maneuvering in flight to a ground landing under pilot control. He has subsequently made other M2-F2 flights.

Mr. Thompson is also recognized for significant engineering and design contributions for the M2-F2 vehicle.

He is also currently scheduled to make the initial flight of the HL-10, the second of two lifting body vehicles Northrop Norair has produced and delivered to NASA.

### People in the News

London, New York and Kyoto, Japan, are among the cities throughout the world where Northrop Corporation personnel have traveled in recent months to present technical papers.

London was the destination of Andrew Wortman in September when he presented his paper, "Experimental Investigation of Distributed Injection Near the Stagnation Point in Hypersonic Flow." The presentation was made to the Royal Aeronautical Society Congress.

R. E. Herfert was in Kyoto in September, delivering "The Effect of Cyclic Stress Creep on Close Packed Metals," to the sixth International Conference for Electron Microscopy.

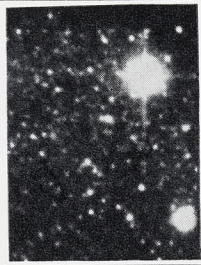
W. W. Harter was in New York City attending the fifth annual Reliability and Maintainability Conference. He presented a paper titled "Reliability Application of AFM 66-1 Maintenance Data."

Five Northrop men were contributors to the American Welding Society's national meeting this month in St. Louis. Their three papers were presented there and were submitted for reprinting in the AWS Welding Journal.

Laurence H. Stone, A. H. Freedman and E. B. Mikus contributed "Recrystallization Behavior and Brazing of the T2M Molybdenum Alloy." Mr. Stone also presented "Brazing of Tantalum Alloy Honeycomb Structures." K. C. Wu and Mr. Herfert collaborated on "Microstructural Studies in the Rene' 41 Simulated Weld Heat-Affected Zones."

Four representatives from Northrop participated in the Institute of Electrical and Electronic Engineers' (IEEE) Aerospace Systems Conference in Seattle.

Robert R. Dye submitted "The Influence of" (See AD ASTRA, page 5)



## SEVEN F-5 PILOTS AWARDED DFC'S AT WILLIAMS

Seven U.S. Air Force combat veteran fighter pilots were awarded the nation's highest aerial achievement award—the Distinguished Flying Cross—recently at Williams Air Force Base, Arizona, for extraordinary achievement while flying the Northrop-built F-5 in Vietnam.

The awards were made for "exceptional flying ability, leadership and outstanding initiative that were instrumental factors in the highly successful evaluation of the F-5A weapons system." Maj. General Henry G. Thorne, jr., commander, 12th Air Force, Waco, Texas, presented the awards.

The Joint Service Commendation Medal was presented to Major Donald F. Crane of the 4441st Combat Crew Training Squadron for his unusual accomplishments in the Military Assistance Program (MAP), delivery and training operations, of the F-5 in Ethiopia.

Training of allied pilots under MAP, in the combat application of the F-5 Freedom Fighter, is the primary mission of the 4441st.

Receiving the Distinguished Flying Cross were: Lt. Colonel Alfred H. Hopkins, jr., commander, 4441st; Major Duane L. Carpenter, Operations officer, who was also the first pilot to log 500 hours in the F-5; Major Ronald J. Crozier; Captains Miles E. Withrow, Robert P. Whitener, Harold J. Huffman and Louis G. Rever.

The seven DFC award recipients are original members of the F-5 Skoshi Tiger unit which trained at Williams AFB. Officially known as the 4503d Tactical Fighter Squadron (provisional), it consisted of 12 aircraft which entered the Vietnam conflict in October 1965.

Following the completion of the Skoshi Tiger evaluation operation in March of this year a new unit of F-5's was formed by the USAF and designated the 10th Fighter Commando Squadron.



Northrop's Hal Hendersen built the Hard Cash Saloon in his back yard to house unique bottle collection, then built ghost town to house unique saloon.

### BOTTLES

(Continued from page 2)

tive, it has not dimmed their love of bottles. They are still fascinated by each new find. They have more than 5000.

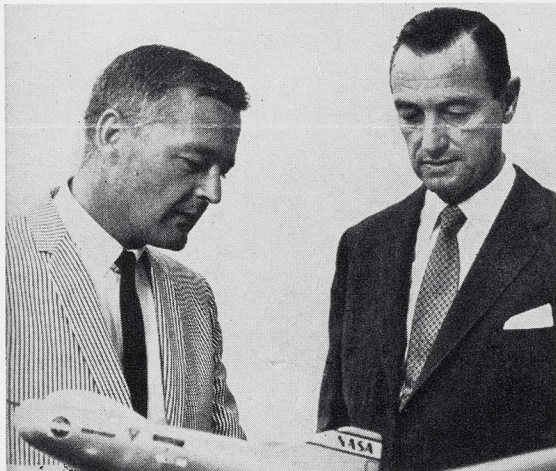
They like to show their liquor and beer bottles of every size and shape imaginable; old bitters bottles, equally assorted, held "tonics" often more potent than liquor but acceptable to temperance-minded families; pumpkin-seed bottles of varying sizes were the forerunners of flasks; and "talking" bottles with imprinted advertisements for their contents, usually medicines.

In the year he has been with Northrop, Mr. Hendersen has found other ghost town enthusiasts.

They are among groups of interested people now invited to "Iona City" as time permits. The Hendersens especially like to entertain youngsters and to acquaint them with the history of each relic.

"Iona City" will never be complete, Mr. Hendersen says. As long as items can be found, it will grow.

In the planning stages now are a "Boothill Cemetery"—sans inhabitants — and a reduced size, five stamp mill.



CONGRATULATIONS—Northrop President Thomas V. Jones (right) congratulates NASA test pilot Milton Thompson on his selection to receive Ivan C. Kincheloe Award for 1966.

## SPACE: Pasadena Contingent Shares in Historical Engineering Efforts

(Continued from page 3)

accuracies of JPL's worldwide Deep Space Net which utilizes tracking and communications stations at Goldstone, California; Johannesburg, South Africa; Woomera and Canberra, Australia; and Reblede, Spain.

In the same section Pete Lau is a scientific programmer, and Phil Grondin provides engineering support to the Space Flight Operations facility and Data Systems Development section.

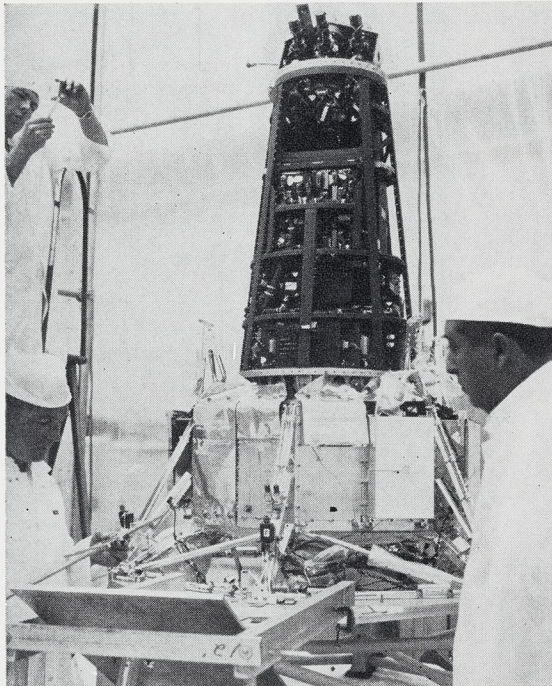
The Mariner Venus program has more Northrop people than any other at JPL. Harold Bigelow, assigned to the Environmental Requirements section, is establishing test conditions for the spacecraft. Shirley Delgado is assisting in reduction, compilation and graphing of data from vibration, shock and acoustic tests of spacecraft hardware.

In the Space Instruments section, Marshall Fong, Al Kanze and Tony Hedrick are performing engineering, test and checkout tasks on the vehicle's data automation system.

In the Lunar and Planetary Instruments section, Gino Vitkus is performing thermal analyses on the Surveyor seismometer experiment. Winston Flood recently completed an assignment in the Lunar and Planetary Sciences section where he was analyzing radar return signals in tests which will prove helpful in a JPL-sponsored technique for sounding planet surfaces.

Many other Northrop specialists are assigned to sections which serve more than one spacecraft.

In the Guidance and Control division, there is Clay Enoch, Charles Fuller, Temple Gilliam, Bob Lawrence, Jim McKinlay, Dimo Karpenko, Phil Presser, Martin Rojas, and Nate Vilensky, who analyze and design flight



Out of the history book comes this view of a Ranger spacecraft during final assembly and inspection, with Marty Rojas, a Northrop engineer, at right.

computers, spacecraft power systems and guidance/control systems.

JPL's Electro-mechanical Engineering Support section has Tony Aveni, Larry Conley, Wallace Cook and Rudy Wakefield. Bob Fee works in Materials Research. Vic Jaworski and Oscar Shev are assigned to lunar spacecraft development.

Mark Christensen, who is president of the Los Angeles Chapter of the Institute of Environmental Sciences, exercises quality control over electronic parts. Paul Ripley engineers electrical systems for various spacecraft.

At least five Northrop men will follow their respective spacecraft to Cape Kennedy for launch. Assigned to the System Test and Launch Operations section are Tom Laney, Jim Lasley, Bob Miller, Harold Varley and Merlin Giefer.

Two Northrop systems engineers—the aforementioned Bob Rubinstein and John Meyer—are looking beyond the existing planetary and lunar programs to the 1970-1990 decades.

Assigned to the Future Missions group of JPL's Project Engineering section, the men are studying possible unmanned probes to Mercury, Jupiter and the planets beyond.

With Northrop people scattered throughout the JPL organization, a mammoth job of providing administrative and personnel services on location falls to Bud Ulf, manager of the Northrop office at the Laboratory.

Mr. Ulf is engineering coordinator and, as such, assists in coordinating JPL's support requirements with Northrop's available manpower and is the direct link between JPL technical supervision and Northrop Support Operations.



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

# Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

## For Sale

**Guitar**, Gibson elec., dble. pickup, \$275 value, \$200. Gardena, 324-7442. A

**Bicycle**, boy's 24", 3-spd., just o/hailed, new tires, tubes, fenders, chain guard, \$23. Huntington Bch., 714-842-5681. A

**Chevy II**, 1963, p/s, b/seats, r/h, 1-owner, \$1450. Torrance, 325-6546. A

**Pickup Truck**, 1949 Studebaker, '52 Chrysler eng., 350 cu. in., Chrysler trans., Merc. rearend, htr., 12 volt elec. sys., \$335. Torrance, 354-6563, 438-1879. A

**Bow**, Shakespeare Wonderbow, mod. 31A-X15, left-hand, full working recurve, contour handle, draw wt. 45 to 50 lbs., length 69", quiver & tips incld., \$65. Orange, 714-639-1785. A

**Camera**, speed graphic, 4 x 5, many extras, \$180. Orange, 714-637-5855. A

**Ford**, 406 Spec. Galaxie 500, 2-dr. sedan, new eng., solid lifters, 3 pr. carbs., 4-spd. trans., \$1650. Inglewood, OR 7-7355. A

**Bicycle**, girl's 26" Schwinn, 3-spd., hand brakes, \$18. Torrance, 371-1096. A

**House**, 4-bdrm., family rm., 2½ baths, 1-acre, horses OK, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

**House**, 3-bdrm., den, 1¼ baths, in Hollypark, \$1750 down, \$23,600. Torrance, PL 4-2286. A

**Tuner**, Sherwood AM-FM, \$50. Redondo Bch., FR 9-1804. A

**Dryer**, 1964 Kenmore, 220 volts, used 8 mos., \$70. Hawthorne, 675-7928. A

**Pontiac**, 1966 Tempest sport coupe, 8-cyl., auto. trans., r/h, 7700 miles, new car warranty, \$2250. Lawndale, 370-3821. A

**House Trailer**, 38' x 8' Stewart-Coach, furn., full bath, refrig., butane stove, new awning, \$995. Hermosa Bch., 374-3638. A

**Surfboard**, Dave Sweet, 9'9", wooden stringers, never used, \$45. Lawndale, 679-2642. A

**Vacuum**, G.E. canister-type, reconditioned, new hose, all attachs., wheels & swivel top, \$25. Torrance, 327-8226. A

**Lot**, commercial acre, in Hesperia, \$3250. Torrance, 370-4641. A

**Washer & Dryer Comb.**, Philco Bendix, \$40. Torrance, 329-6748. A

**Home**, 3-bdrm., fam. rm., 1¼ bath, all bltins, cpts., dps., sprinklers, softener, patio newly painted, \$27,500 or lease \$235. Hollywood, 323-8657. A

**Dodge**, 1951, 4-dr. sedan, 39,000 act. miles, stick shift, new paint, 2 new tires, \$175. Inglewood, PL 5-8158. A

**Ice Box** for 100# Mobilair camper, used twice, \$15. Hawthorne, OS 6-8842. A

**Falcon** Station Wagon, 1961, 4-dr. deluxe, r/h, w/s/w, auto., new eng., \$750. Torrance, DA 5-7705. A

**Dishwasher**, GE Mobilemaid, 1965, \$125. Torrance, 326-6195. A

**Sailboat**, Lido-14, w/trailer, cover, many extras, financing avail., \$1250. Manhattan Bch., FR 4-4780. A

**Surfboard**, Jacob, 9', good for beginners, \$70. So. Gate, 633-4477. A

**Boat**, 14' Burchcraft outboard w/lights, steering, cover, \$100. Torrance, DA 3-7544. A

**Falcon**, 1962, 4-dr. sedan, auto. trans., deluxe model, \$675. Chatsworth, 882-0761. A

**Honda 160**, 1965, low miles, \$400. Box 2001. A

**Fairlane**, 1957, p/s, p/b, p/w, rebilt. auto. trans., new w/s/w tires, r/h, \$295. Artesia, 860-3122. A

**Pontiac**, 1937, cpe., classic, 71,000 act. miles, new tires, rest of car all orig., \$225. Hawthorne, 678-6027. A

**Renault Dauphine**, 1959, new tires, brakes, battery, gen., recent motor o/haul, \$150. San Diego, 648-2939. A

**Rifle**, 30-06 Winchester, model 70, w/adjust. Weaver scope, 2¼ to 5 power, case, \$125. Torrance, 830-4332. A

**Jaguar**, 1954 XK120 sport roadster, roll bar, wire wheels, motor & trans. o/hailed, new top, upholstery & tonneau cover, \$795. Gardena, DA 4-9593. A

**Corvair Corsa**, 1966, 4-spd., supercharger, fully equipped, take over \$66 mo. pymnts., \$2350. No. Long Beach, 422-3253. A

**House**, 3-bdrm., den, new birch kitchen, cellar, 2-car gar., 2 rms. upstairs, close to beach, \$145 mo. rent or \$29,950. Hermosa Bch., FR 9-7342. A

**Supercharger Judson** for VW, all parts & instructions, \$85. Lomita, 326-0221. A

**Tape Deck**, Bell 4-track stereo play/record, Knight factory aligned/tested stereo recording pre-amp, has all features, \$200. Redondo Bch., 379-4559. A

**Bicycle**, girl's, includ. metal basket, \$15. Gardena, 327-2598. A

**Yamaha**, 1964, 80 cc, new trail sprocket & chain, o/sized rear tire, \$250. Hawthorne, 679-4237. A

**Piano**, baby grand, Bush & Lane, w/bench, plain design, dark, \$450. San Pedro, TE 3-4191. A

**House**, 3-bdrm., 2-bath, den, fireplace, next to school & golf course, \$25,900. Torrance, 375-6071. A

**Love Seat**, Lawson, salmon pink shade, \$75. Torrance, 371-4056. A

## For Sale

**Rifle**, custom-built 30.06 '03A3 Sporter, hand inletted, fancy-grade Monte Carlo stock w/4X scope, recoil pad & sling, cost \$300; \$225. L.A., 635-6055. A

**Comet**, 1960, 4-dr., stick, eng. o/hailed, new ignition, \$450. Downey, 923-7690. A

**Alfa Romeo**, 1961 Super Spyder rdstr., 2 new tires, \$950. L.A., 645-5158. A

**Sprite Parts**, comp. head, sup. carburetors & disc brakes, \$200, or sell sep. Port. Bend, 377-2921. A

**Lot**, wooded at Snow Summit Estds., Big Bear Lake, 80' x 100', utilities in, financing avail., \$6950. Fullerton, 714-525-1677. A

**Buick Invicta**, 1961, h/top cpe., air, w/s/w, p/s, p/b, auto. trans., b/seats, 58,000 miles, \$995. P.V. Pen., FR 7-6458. A

**Refrigerator**, Admiral, 2-dr., 5 yrs. old, \$75. Gardena, 644-1485. A

**Chevrolet**, 1957, 2-dr., h/top, V-8, auto., r/h, other extras, \$450. L.A., 645-0475. A

**Piano**, Espey console, model 1957, spinet w/full keyboard, mahogany finish, \$500. Compton, 672-1422. A

**Exerciser Bike**, handle bars move back & forth, seat height adjusts, dual action, \$10. Torrance, DA 9-2016. A

**Motorcycle**, Harley Davidson 74, 1961, new paint & tune up, \$550. P.V. Estds., 378-0603. A

**Dinette Suite**, blonde, modern, buffet, table w/custom pad & 6 chairs, \$35. Playa del Rey, 823-1787. A

**Shotgun**, over & under, European custom, selective ejectors, \$135. Rossmoor, GE 1-7696. A

**Power Mower**, Craftsman, reel-type, \$20. P.V. Pen., 377-9842. A

**Cadillac**, 1958, full power, factory air, \$350. L.A., 670-6237. A

**Clothing**, young man's, sport shirts, 14½ & 15, trousers, continentals & newest styles, 29 waist, 29 length, shirts, \$1 ea., trousers, \$3. Inglewood, OS 6-1475. A

**TV**, 19" table model Emerson, wood cabinet & in working condition, \$25. Torrance, DA 6-4898. A

**Transmission**, Chevy Power Glide, \$50. Hawthorne, 679-5371. A

**Pickup**, 1963 Falcon Ranchero, 6-cyl., 27,000 miles, new tires, 1-owner, \$1250. Torrance, 375-3728. A

**Silverware**, silverplate setting for 8 w/case, \$9.90. Hawthorne, 676-0418. A

**Pontiac**, 1963 Tempest, 2-dr., p/s, factory air, V-8, auto., 2 new tires, \$1200. Inglewood, OS 6-0049. A

**Chevy II**, 1963, super sport, 6-cyl., w/chrome wheels, b/seats, auto. trans., \$1395. Gardena, 323-6759. A

**Camera**, Mamiya, auto., 16mm, \$40. Torrance, FA 8-3306. A

**Guitar**, elec., Fender Stratocaster & case, \$225. Torrance, 371-9925. A

**Acreage**, 10 acres, near Rosamond, \$950 down & take over pymnts. at 6% interest, \$5950. Torrance, FR 8-1026. A

**Trailer**, 2-wheel enclosed, 5' x 8', new tires & wheel bearings, \$125. Inglewood, 672-0877. A

**Movie Camera**, Jelco 8-EC-1 8mm cine, 3-turret lenses, bltin exposure meter & filters, pistol grip, leather carrying case, \$25. P.V. Estds., FR 7-2294. A

**Thunderbird**, 1956, \$1200. Hawthorne, 675-7381. A

**Buick**, 1956, \$200. Inglewood, 370-3023. A

**Bicycle**, girl's 3-spd., 28", \$20. Redondo Bch., FR 5-8804. A

**House**, 3-bdrm., 1-bath, cpts., dps., patio, \$22,500. Torrance, 326-4839. A

**Falcon Futura**, 1965 station wagon, still under warranty, air cond., auto. trans., r/h, \$1950. Placentia, 524-1686. A

**Honda**, 1963-64, Dream 300 mod. to 350 cc, lge. handle bars, auto. starter, \$400. Gardena, DA 4-0649. A

**Stove**, gas, Wedgewood 36", white, w/broiler, oven & storage space, \$30. Anaheim, 635-3315. A

**Washer**, deluxe Frigidaire auto., white, \$115. So. Pasadena, 254-8973. A

**Home**, 4-bdrm., fam. rm., 2-baths, all bltins, incl. auto. dishwasher, fenced & landscaped yd., 70 x 150 lot, 1 mile from Research Park, 5½% existing loan, \$39,000. P.V., 377-5172. A

**Power Supply**, 12 volt d.c. & 18 volt a.c. output, 110-115 volt a.c. input, for lge. model railroad or slot car track, 12 amp. rated, \$15. Box 2002. A

**Mercury**, 1956, 4-dr. h/top, auto. trans., p/s, p/b, r/h, 2 new tires, new battery, rebilt. p/brake unit & radiator, \$295. P.V. Estds., 373-1013. A

**Bed**, dble, walnut finish h/wood, half canopy, Simmons innerspring mattress & box springs, \$75. Sherman Oaks, ST 8-9709. A

**Honda**, 1966 305 Scrambler, 2 mos. old, assume \$43 mo. pymnts., incl. full insurance, no equity, \$946 approx. bal. Box 2003. A

**House**, 3-bdrm., 1-bath, cpts., dps., newly painted, lot 50 x 150, dble. detached gar., \$24,500. Hawthorne, 675-2315. A

**Rocking Chair**, early Amer., w/pads for seat & back, \$15. Torrance, 375-6467. A

**Bench Drill**, Atlas 15", ½" Jacobs chuck, \$60. Rolling Hills, 377-2200. A

## For Sale

**Crib & Mattress**, wood retractable sides, \$5. P.V. Pen., 377-9666. A

**Mobile Home**, 2-bdrm., 10 x 50, furn., \$2295. Orange, 714-532-1361. A

**Outboard Motor**, 5 h.p. Clinton, \$65. Huntington Bch., 897-6992. A

**Movie Projector**, 8mm Bolex, 18-5, \$75. P.V., 377-5059. A

**Dodge**, 1961 station wagon, 3-spd. trans., p/s, p/b, factory air, \$795. Long Bch., 597-1788. A

**Buick**, 1956, 2-dr., h/top, p/s, p/b, auto. trans., \$175. Rolling Hills, FR 7-1404. A

**Motorcycle**, 1963 Triumph, 650 cc, \$700. Cypress, 828-5943. A

**Pool**, 18' x 4', pump, filter, ladder, \$75. Rolling Hills Estds., 377-0114. A

**Dodge Dart GT**, 1963, 6-cyl., h/top, \$1250. Manhattan Bch., FR 6-6848. A

**Wig**, hand-tied shoulder length, blond, adjus. size, cost \$125; \$50. Gardena, 324-0215. A

**Travel Trunk**, \$10. P.V., FR 7-6435. A

**Auto Top Carrier**, 42" x 42", water-proof, \$25. San Pedro, TE 3-9253. A

**TV Set**, Zenith, 1963 23" console w/remote control, \$125. L.A., 656-0201. A

**Airplane**, Cessna 140, all metal, C-90-12F 1150 on remf'g, LTRA-6 w/ILS & MKR BCN & Lightcraft Model 66 radios, post lighting, full gyro panel, wheel exts., \$2400. Orange, 714-532-1510. A

**Home**, 4-bdrm., 3-bath, lge. cathedral living rm., located 1 mile from all 3 P.V. schools, \$56,000. P.V., 377-6100. A

**Oldsmobile**, 1957, 2-dr., h/top, auto. trans., p/s, p/b, r/h, air cond., J-2 kit avail., 50,000 miles, orig. owner, \$399. P.V. Pen., 377-6124. A

**Pickup**, ¾-ton Chevrolet, 1954, new tires & new rebilt. eng., \$260. Gardena, OS 5-2159. A

**Honda**, 55 cc, 1964 trailbike, spark arrester & bell helmet, low mileage, \$250. Hawthorne, 676-3886. A

**Furniture**, 3-pc. provincial living rm. set, wing back, w/ruffled flounce, sofa, tangerine, 2 chairs, avocado green, \$250. Lawndale, 675-3957. A

**Yamaha 80**, 1965, extras, low mileage, \$225. Hermosa Bch., FR 2-1895. A

**Formal**, sky blue, floor length w/half slip, sheath style w/empire waist, size 10, \$25. Lawndale, 676-3050. A

**Chevrolet**, 1957 Bel Air, 4 new tires, new paint, brakes & motor, \$650. Lawndale, OS 5-2978. A

**Desk**, 7-drawer, maple, matching night stand, \$25. L.A., AX 4-0727. A

**Oldsmobile**, 1964 F-85 station wagon, p/s, p/b, p/tailgate wind., air cond., 2 new tires, r/h, \$1950. Inglewood, PL 4-7861. A

**House**, 3-bdrm., 1¼ bath, E. Anaheim, GI loan avail., \$25,900. Anaheim, 774-6590. A

**Dishwasher**, port. auto., delux pushbutton GE, \$110. Diamond Bar, 595-5877. A

**Chevrolet**, 1958, 348 cu. in. eng. 409 rac. clutch, Muncie 4-spd., Hurst 4.56 posi., hvy. duty springs & shocks, stereo & tapes, p/s, p/b, radio, many other extras, \$1950. Inglewood, 677-1495. A

**Kittens**, Siamese, seal point, 2 males & 3 females, pure bred, fem. \$15, males \$20. Hawthorne, 677-7224. A

**Boat**, 14' runabout, factory-blt., hull pressed fiber, 25 h.p. Evinrude motor & trailer, \$295. Gardena, DA 4-8853. A

**Guppies**, male & female, good markings, .20¢ ea. or 3 for .50¢. Torrance, 324-2992. A

**Honda**, 305 Scrambler, 1965, metal flake, blue tank, swinging arm body; chrome front & rear shocks, many extras, \$600. Inglewood, 674-5442. A

## For Sale

**Motorcycle**, Spanish 1965 Bultaco-Mercurio, 175 cc, 2500 miles, \$400. Inglewood, PL 6-7681. A

**Ford**, 1965 Galaxie convt., 352 eng., 4-bbl. carb., new tires, 25,000 miles, \$1995. L.A., PL 6-2587. A

**Table**, 30" round, mahogany, Duncan Phyfe lamp table, \$10. Gardena, OS 5-5258. A

**Wheels**, 2 14" chrome reverse, Ford 5-Lug, \$25. Torrance, 320-2002. A

**Pontiac**, 1966 Tempest, custom V-8 auto., p/s, p/b, r/h, 6600 miles, \$2350. P.V. Pen., 377-6528. A

**House**, stucco, 2-bdrm., full dining rm., fireplace, cpts., dps., dble. gar., lot approx. 45 x 145, \$20,950. Inglewood, OR 1-3860, FR 5-5097. A

**Mattress**, box spring, dble. ortho. 5-dwr. dresser, night stand, bookcase headboard, \$65. Anaheim, 774-2779. A

**Furniture**, 5 rms.; washer, Kenmore delux, \$40; dinette set, 4 chairs, \$15; other items various prices. Long Bch., 429-4349. A

**Acreage**, 5-acre parcel, in Hi-Vista desert area, approx. 14 miles so. of Edwards AFB, has small weekend cabin, \$3000. P.V. Pen., 377-6434. A

**Living Room Couch**, \$40. Torrance, 378-0094. A

**Piano-Accordion**, Frontalini, w/case, \$90. Hawthorne, 679-9658. A

**Wanted to Buy**

**Chevelle or Chevrolet**, 1963-1965, must be in good condition & priced reasonably, cash. Inglewood, 755-1071. B

**Blue Chip Stamp Books**. L.A., 463-9340. B

**Rentals Offered**

**Exec. Home**, Hollywood Riviera, close to South High School, 4-bdrm., 2 baths, lge. family room, bltins, cpts., dps., dishwasher, \$300. Torrance, DA 6-1205. E

**Cabin**, A-frame, at Big Bear Lake, Moonridge area, sleeps 6 adults or 4 adults w/children, 1 block from golf course, swim. pool & riding stables, \$30 w/end; \$80 wk. P.V. Estds., FR 7-3888. E

**Cabin**, Lake Arrowhead, close to lake & village, fireplace, all modern, \$25 w/ends; \$55 wk. L.A., 761-9645. E

**Apt**, 1 or 2-bdrm., furn. or unfurn., cpts., dps., heated pool, near Norair, \$105 & up. Gardena, 321-0928. E

**Apt**, deluxe 2-bdrm. unfurn., lge. pool & patio, cpts., dps., bltins, closed gar., near El Camino, \$120. Torrance, DA 9-5986. E

**Apt**, 1-bdrm., unfurn., bltins, pvt. deck, closed gar., hobby shop, hot water & trash pd., \$95. mo. Torrance, FR 5-0867, 320-7547. E

**Apt**, 2-bdrm., bltins, dps., 1½ bath, close to schools & transportation, \$110 mo. L.A., OR 0-4473. E

**Cabin**, Big Bear Lake, mod., sleeps 7 to 9, \$18 w/end; \$50 wk. Bellflower, TO 7-0662. E

**Apt**, 2-bdrm., 1½ bath, unfurn., cpts., dps., bltins, near schools & recreation, \$125. Inglewood, 644-2565, 672-1890. E

**Studio Apt**, 2-bdrm., 2½ bath, pvt. deck, sub. gar., cpts., dps., dishwasher, elec. bltins, near San Diego Fwy., adults, lease, \$180. Inglewood, 673-0615. E

**Apt**, 1-bdrm., furn., all bltins, pvt. deck, lge. pool, ample sub. parking, near Northrop, \$135 mo. Lawndale, 679-2117, 670-6084. E

**Apt**, unfurn., 2-bdrm., pvt. gar., redecorated, tile kitchen & bath, disp., water & trash pd., baby OK, no pets, \$110. Hawthorne, OS 5-8335. E

**Apt**, delux, 1-bdrm., pool, bltins, \$95 mo. Redondo Bch., 376-2117. E

## AUSA DISNEYLAND TICKETS AVAILABLE

A full evening (8 p.m. to 1 a.m.) of Disneyland attractions for only \$3.75 is still being offered Northrop employees and their families on October 28.

That's when the Association of the United States Army has reserved the fun center. Northrop families have been issued a special invitation to take part. Tickets may be obtained through normal ticket outlets.

## Rentals Offered

**Apt**, 1 & 3-bdrm., 2 bath, 3 blocks from Redondo King Harbor, cpts., piped music, bltin vacuum, gar., storage, \$105. Redondo Bch., FR 6-9608. E

**Vacation Cottages**, Idyllwild, 1 & 2 bdrms., sleeps 6, fireplace, patio, stream, \$20-\$35 w/ends; \$45-\$65 wk., L.A., PL 4-5288. E

## Child Care Offered

**Baby Sitting**, my home. Inglewood, 672-1952. G

## Personals

**To his friends & acquaintances** at Northrop whom he had known for such a short while, we, his family, wish to express our sincere appreciation for the cards, messages, & flowers at the time of his passing. MRS. GEORGE CLEMENTS & CHILDREN. L

**Ironing**, my home, \$1 hr. Hawthorne, 644-2440. L

I wish to extend thanks to all my friends at Northrop for remembering me while I was in the hospital in Chester, Calif., on my way home from Alaska. Your cards, letters & planters meant so much to me at that time & I will never forget your thoughtfulness, this includes the NRC staff, Retiree Club & the Gem & Mineral Club. HOWARD CONVERSE. L

**My thanks** to all those wonderful gals & fellows who were so kind to me when I left the Norair Engineering Center for our Anaheim facility. I love the country out here, but I miss you all very much. ELLA ARMSTRONG POST. L

**Wanted** for distressed family; 1 set bunk beds & 1 dble. bed, springs & mattresses. Children & parents sleeping on floor. Contact Welfare Coordinator, Norair, ext. 4786. L

**The family** of Mariana F. Goodwin wishes to express sincere appreciation to all the Northrop friends for the kindness & sympathy extended at the recent passing of our beloved daughter. L

## For Sale or Trade

**Pickup**, 1949 Ford, ¾-ton, '57 eng., 6-cyl., \$175, or trade for welding equipment, metal working machinery, compressor, or guns. Hawthorne, OS 9-3476. M

**TR-4**, 1963, new tires, o/drive, \$1500, or trade for car of same value. Fullerton, 714-871-5617. M

**House**, 3-bdrm., 3-bath, formal dining rm., family rm., dble. gar., workshop, 7 yrs. old, Cape Code style, \$55,000 or trade for home in Orange County. Miraleste, TE 3-5515. M

## Going my way?

## Rides Wanted

7:30 a.m. — 4:12 p.m.

**So. Birch Ave.** & 118th, Hawthorne. G. Lees, Norair, ext. 1131, 675-1471.

**El Toro Area**, El Toro. R. Steed, Norair, ext. 1038, 837-8963.

## Rides Offered

7:30 a.m. — 4:12 p.m.

**El Toro Area**, El Toro. R. Steed, Norair, ext. 1038, 837-8963.

# AD ASTRA PER ASPERA

(Continued from page 4)

Airplane Pre-Delivery Test Policies upon System Reliability."

Mr. Wortman presented "Two Methods of Aerodynamic Testing in Hypersonic Wind Tunnels."

Trevor A. Robinson presented "Choosing the Electric Power System for a Short Range Missile."

And J. W. Murphy wrote and submitted "Conductor Shielding for Lo-Hi Electromagnetic Interference."

Two Northrop men—W. F. Sharpe and John K. Stauffer—were representatives to the sixth national Conference on Environmental Effects on Aircraft and Propulsion Systems, held in Trenton, New Jersey, in September.

Mr. Sharpe's paper was titled "Minimizing Gun Firing Effects on the F-5 Propulsion System." Mr. Stauffer's was "Electrical Anti-Ice Windshield Analysis."

In San Francisco early this month, three Northrop men combined to present two papers, before the National Association of Corrosion Engineers.

A. H. Freedman and M. Katcher co-authored

"Development of Hydrostatic Pressures in Liquid-Filled Cracks." T. R. Croucher wrote "A Comparison of Stress Corrosion Testing Techniques and Environments for Precipitation Hardening Stainless Steels."

D. P. Wilhem was in Atlantic City, New Jersey, presenting "Investigation of Cyclic Crack Growth Transitional Behavior" to the American Society for Testing and Materials Fatigue Crack Propagation Symposium.

His following paper, "Crack Propagation and Stress Intensity Interrelationships Accompanying Fatigue of Sheet Materials," will be presented in Pittsburgh next month to the Society for Experimental Stress Analysis.

F. W. Peitzman was in Hampton, Virginia, delivering "Development of a Bellmouth for the Trisonic Circuit of the Northrop Norair High-Speed Wind Tunnel Facility" to the Supersonic Tunnel Association.

Joe Der, jr., was co-author of "Studies on Laminar and Turbulent Free Shear Layers with a Finite Initial Boundary Layer at Separation." He did not attend, but the paper was given in Brussels, Belgium, to the AGARD Specialists' Meeting on Separated Flows.



## Bill Rothwell Heads Hawk Programs

William A. Rothwell has been appointed to a new post as Hawk Program manager, reporting to Frank Lynch, Northrop Nortronics vice president and manager of Operations.

Mr. Lynch said Mr. Rothwell will be responsible for coordinating and planning all necessary action to meet increased demands for our Hawk product line."

Mr. Rothwell has been with Northrop since 1962. He joined Nortronics as program manager on the Boeing rocket launcher program and has served since then as chief application engineer for Ordnance programs, as a special assistant to Mr. Lynch and as program manager for FLIP.

Shifting to Northrop Norair in 1965, Mr. Rothwell joined the New Product Development organization and subsequently was appointed to the senior technical staff for the manager of Research and Development.

He returned to Nortronics last month for his new assignment.

Mr. Rothwell is a graduate (BS in mechanical engineering) of the University of Rhode Island. He formerly worked for General Electric in the flight propulsion field as program manager for the CT-58 engine before joining Northrop.

## Women's Club Hosts Winter Fashions

Winter fashions, direct from outstanding area shops and shown by professional models, will be featured October 22 when the Nortronics Anaheim Women's Club holds its annual fashion show.

The place is the Los Coyotes Country Club and the time, 11:30 a.m. The price, which includes lunch, is \$3.50.

Disc Jockey Glenn Edwards will handle introductions and Florence Smales of the Ed Harrell Modeling Agency, commentary.

Fashions will be featured from Wanda's (Garden Grove), Back Street (Fullerton and Santa Ana), Joan Buck (Santa Ana), Saks (Tustin), Veta's (Newport Beach) and Disneyland Hotel (Anaheim).

Tickets may be obtained through Personnel Activities.

## A THANKS FOR THE SERVICE



Frank McMillen (left), an administrator in the Receiving group at Nortronics' Applied Research department in Newbury Park, receives his 20-year pin from Dr. D. A. Hicks, Corporate vice president and NARD manager. Mr. McMillen joined Northrop Norair in 1946; went to Northrop Ventura in 1956; and to NARD in 1965. He and his wife live in Newbury Park.

## PILOT: From Earliest Air Mail To Combat Missions in P-61

(Continued from page 1)

tional aids. When the ceiling dropped to 500 feet, passengers were eliminated, but the mail had to go through.

Such a mail-only flight in fog and rain one night ended Mr. Severson's commercial piloting career and almost claimed his life.

"We were flying low and slow with little or no visibility," Mr. Severson recalled. "I opened my window to attempt to wipe the windshield. When I flipped on the landing lights there were these trees and a bluff dead ahead. Although the pilot took quick evasive action, we lost a wing and went in on our back."

Mr. Severson suffered a compound leg fracture that was later complicated by bone infection. He was hospitalized for 20 months. The pilot, although injured seriously, also survived.

In 1936 Mr. Severson was recalled to active duty and served as a pilot and instructor along the eastern seaboard and in the Virgin Islands. He advanced to

command an air squadron and later served at Marine Corps Headquarters.

In early 1944 Mr. Severson took a group of six Marine pilots and six potential radar operators to England for training with the Royal Air Force in night fighter operations. He flew British Mosquito and Beaufighter aircraft there.

At the conclusion of his training, Mr. Severson joined the Army Air Corps' new 422d Night-Fighter Squadron, an elite group at the time.

In 20 combat missions over Europe, Mr. Severson flew the Northrop-built P-61 "Black Widow" night fighter.

"That was quite an aircraft, modern airborne radar, good range and handling characteristics and equipped with superb black-light cockpit lighting," Mr. Severson said.

At the conclusion of European hostilities, Mr. Severson returned to the United States briefly then went on to serve in the Marshall Islands, Okinawa, the Philippine Islands and China.

Next followed a series of assignments as a command pilot and schooling before United States troops were sent to Korea. Mr. Severson commanded a Marine group there and suffered a broken back on a combat mission.

Back in the United States again, Mr. Severson entered, as a full colonel, helicopter pilot training and soon took over command of a Marine Air Group.

He graduated from the National War College and moved on to fill a number of key assignments with Marine Corps air units until his retirement in 1959.

Shortly after retiring, Mr. Severson joined Nortronics' Marketing staff and now serves at Nortronics Anaheim.

He still keeps up his pilots' license, flying small pleasure aircraft from Orange County and taking part in an occasional cross-country tour or trip.

## Combat Veteran Calls F-5 'Finest I've Seen'

"The F-5 is the finest fighter I have ever flown. Everyone in Vietnam looks up when the F-5 boys split the sky. This is one bird that has found a home in a combat zone."

These comments sum up the feelings of one of the most experienced Air Force officers now flying the Northrop-built F-5 on combat missions in Vietnam — Major Richard E. Williams.

Major Williams now serves as operations officer for the 10th Fighter Commando Squadron, 3d Tactical Wing, Bien Hoa Air Base, Vietnam.

His credentials are impressive. They include more than 5146 flying hours in 33 types of aircraft, a senior pilot's rating, and more than 182 combat missions against the Viet Cong flown in the F-5.

An Air Force Times article datelined "Vietnam" describes Major Williams as "a stout, middle-aged man who walks tall." It points out Major Williams came to Vietnam as maintenance officer for the 4503d Tactical Fighter Squadron, the "Skoshi Tiger" project which proved the F-5 could "earn its keep in a combat zone."

"We flew the birds (the F-5's) all the way to Vietnam with in-flight refueling," the major commented. "We landed at Bien Hoa without a single maintenance problem. Within three hours after landing, some of the F-5's were dispatched on combat missions."

Although a majority of men who took part in the "Skoshi Tiger" evaluation program returned to the United States after completion of this program in Vietnam, Major Williams volunteered to remain for more combat duty.

He became a member of the 10th Commando Fighter Squadron, the only F-5 equipped unit in Vietnam. This unit has now logged more than 5000 strike missions over North and South Vietnam.

Major Williams has been hit only once. "A 50 caliber got me through the nose," he said with a smile. "The bullet went clear through the needle nose, but the plane flew like a dream for the rest of my mission."



Mr. Severson



Major Williams

## TALK

(Continued from page 1)

wind tunnels, our manufacturing and research facilities at all Northrop divisions," he said.

"To reach our goals for 1969 alone will require in the neighborhood of \$150,000,000 more assets—more tangible things that all of us work with," he said. "Earnings are the key that will make this possible."

To illustrate how earnings contribute to the company's growth, Mr. Jones pointed out that when Northrop was formed in 1940 it had 600 employees and assets of \$2900 per employee. Today with 18,500 employees, the company has assets of \$11,000 per employee. In the next three years Mr. Jones projected this figure will grow to over \$16,000 per employee despite a substantial rise in employment.

Mr. Jones gave the Management Club a breakdown of how the Northrop sales dollar is disbursed. The biggest share—52.7 cents—goes into payments to employees in wages, salaries and benefits. Suppliers receive 38 cents for materials and services. Taxes take 3.7 cents. Wear and tear on equipment takes 1.9 cents, and .7 of a cent goes to interest payments.

Only three cents out of the total sales dollar represented earnings, of which 1.2 cents was paid in dividends to shareholders in the year just concluded. This left 1.8 cents for use in the business for new facilities, working capital, and so forth.

With growth, the company must redouble its efforts in obtaining new business, new products, new developments, new technical ventures, he emphasized.

"Growing 10 percent from \$600 million in sales requires twice the effort it takes to grow 10 percent from \$300 million. It demands twice the new developments, twice the new advances, twice the new products.

"We intend to intensify these efforts," he said.

Mr. Jones pointed out once again that earnings, sales and backlog established new records for the company in the financial year ended July 31 (Northrop News, September 29, 1966).

"All of you contributed a great deal to the results of the past year, and I want to recognize and thank you for it," he said.

## OPEN HOUSE: A Look Backstage

(Continued from page 1)

facilities and some indication of Open House activities taking place in each.

For each guest, young or old, there was a special commemorative coin, cast just for the occasion.

Located throughout the facility were 100 hosts and 35 hostesses on duty to answer questions and man special displays.

For instance, an outstanding Deep Submergence Systems Program display was a crowd pleaser. It included real skin divers, photographs of under water and surface equipment, motion pictures and a hook used to recover a missing hydrogen bomb off Spain. There were many other interesting features in this one attraction.

Elsewhere there were automation systems, information systems,

automatic checkout and test units and assorted supporting items. There were also ordnance displays and a zoom lens exhibit, as well as illustrated and animated exhibits of many types.

There were special displays of packaging and shipping equipment, material processing and handling and even stores handling.

Northrop Data Processing's Anaheim terminal put on a crowd-pleasing exhibit that included whirling computer systems, card sorters and rapid printers.

Mr. Lynch had a special word of praise for the men and women who helped set up and operate Open House displays and exhibits.

"These people devoted a great deal of time to this event and deserve a majority of the credit for its success," Mr. Lynch said.



# NORTHROP NEWS

NORTHROP NORTRONICS

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October 26, 1966

## 25-Year Club Holds First Annual Honors Dinner

A new Quarter Century Club, formed by and for Nortronics veterans who have completed 25 years with Northrop, held its first annual Recognition Dinner October 11 at the Long Beach Elks Club.

At that time eight new members who have recently completed their 25th Northrop year were welcomed by 19 others who have already passed the quarter century service milestone.

The new members are Alvin E. Allen, Arthur R. Dietrich, Oscar Fogle, Charlie H. Furman, Paul G. Harlow, Kirk W. Hunt, Dave T. Meeker and Dale H. Moreland.

Frederick Stevens, Northrop vice president and Nortronics general manager, presented the new members with 25-year service pins.

As he introduced each new 25-year pin winner, Mr. Stevens also introduced his wife. He stressed the importance of the wives to Northrop families and spoke of their many unsung contributions.

Mr. Stevens recognized 700 years of service to Northrop represented in the Quarter Century Club. And he noted the group has many more years of service to contribute, a contribution that will continue indefinitely, if the veterans will give encouragement to young people, tell them the true Northrop story.

"Our job is to perpetuate a stream of good people in the Northrop tradition," Mr. Stevens said, "a tradition of which each of you

(See CLUB, page 6)

## "FLOATED BALL NAVIGATOR" TOURS NATION



ON ITS WAY TO BE VIEWED by defense and aircraft manufacturing, and airline officials, Nortronics "Floated Ball Navigator," often called the "suitcase navigator" was installed by division engineers and technicians in a DH 125 twin engine executive jet. The compact unit, directed by an NDC-1050 computer, makes use of a transportable stable platform using a floated ball instead



of gimbals. Shown carrying it aboard aircraft is Duane "Red" Pamperin, senior field engineer. At right, Pamperin and L. J. Baker (top of photo) chief, advanced inertial systems, observe the unit in action during a flight test. The unit will be shown by in-flight demonstrations in key cities including San Francisco, Seattle, Chicago, New York, Washington, Dayton, Atlanta and Tulsa.—photos by Keller.

### TAKE TIME OUT! TIME CHANGE AHEAD

It's time out to change the time again.

At 1 a.m. Sunday morning, October 30, all California clocks will be turned back one hour from Pacific Daylight Saving Time to Pacific Standard Time.

All Northrop facilities will set clocks back one full hour on all regular work schedules beginning Sunday.

Don't forget to change all clocks at home accordingly. It's time for change in time.

## Reveal How Computer Group Made Design Breakthrough

Ed Klein, chief, Computer Development, Nortronics Division, credits the basic breakthrough in the original idea for the NDC-1051 computer to the total dedication to the job by the highly motivated people in the group.

According to Mr. Klein, the original idea was to provide industry with a capable low cost airborne digital computer by minimizing components and virtually eliminating time consuming assembly processes.

A unique solution to the problem of packaging helped achieve this goal. Prior to the development of the NDC-1051 packaging concept, computers either used an extensive amount of wire to interconnect the logical elements or made use of high cost multi-layer boards. These methods were costly and in the case of the latter, introduced reliability problems.

(See COMPUTER, page 6)

## 5000 Attend 3rd Annual Art Show

More than 5000 persons attended the Palos Verdes Community Arts Association's third annual show, held this month at Nortronics Palos Verdes.

"The turnout was even greater than expected," an association member said, "and many people told us they thought it was our best show yet."

The outdoor show was aided by temperatures in the high 70's, both on October 15 and 16, the two days of the show.

### 60 Paintings Displayed

Several members of the NRC Art Club from Nortronics Anaheim were among the exhibitors. Ed Mosher, Bob Peck, Harold Leff and Ted Witsil had approximately 60 paintings among them on display, and Harry Futoran exhibited sculptures.

"We felt that the show exhibited the most diversified group of artists to be found anywhere in Southern California," the art group spokesman said. "We had everything from painting to jewelry making; from sculpture to stoneware."

Danny Gravlin, chief of Facilities at Nortronics Palos Verdes, was in charge of grounds operations for Northrop.

## PPD Awarded \$4 Million Gyro Contract

Contracts totalling about \$4 million have been received by Northrop Nortronics for follow-on production of Minuteman Inter-Continental Ballistic Missile Inertial Guidance units.

The units, auxiliary gyroscopes and test equipment, will be produced by the firm's Precision Products department, Norwood, Massachusetts, which developed them specifically for the Air Force program.

The award was made by the Autonetics Division of North American Aviation, Air Force associate contractor for the ICBM's inertial guidance, flight control and aerospace ground equipment.

The gyroscopes provide pre-launch flight data to the Minuteman missile.

## NARD Joins Conejo Valley Industry Group

Northrop Ventura and Northrop Nortronics Applied Research department, both with headquarters in Newbury Park, are two of the nine charter members of the newly formed Conejo Valley Industrial Association.

The nine firms, all in the Rancho Conejo Industrial Park area, formed the association, according to a press release, "to promote the mutual welfare of member firms and their employees."

"In particular, the association hopes to stabilize the labor force by a mutual exchange of information concerning personnel needs and requirements, in order that displacement of people into and out of the area may be kept to a minimum."

### Hicks Treasurer

Dr. D. A. Hicks, Nortronics vice president and manager, Applied Research department, was elected association treasurer at an organization meeting last month. Officers will serve on a rotating basis.

Representatives said their first project will be consideration of a plan to develop a joint supervisory training program for foremen.

## News Wires Report F-5 Selected For Netherlands Defense

The news wire services reported as the Northrop News went to press that the Netherlands Ministry of Defense has selected the Northrop F-5 Tactical fighter to replace older combat aircraft in the Royal Netherlands Air Force.

An official communique issued at The Hague following a meeting of the defense ministers of Holland and Belgium was the source of the announcement. A decision regarding the Belgian selection of a new fighter was promised not later than February 15, 1967.

## Freedoms Foundation Honors Daughter Of Anaheim's Jack Evans

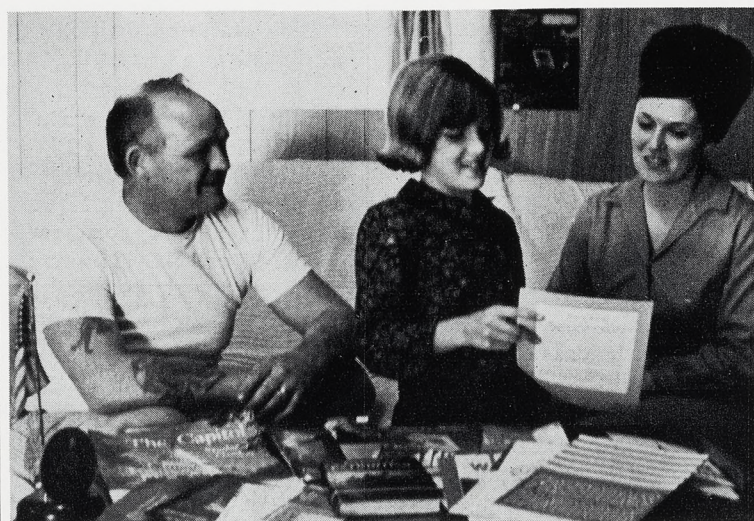
While current political issues are sure to divide opinions within a certain sector of Anaheim, there is an unanimous feeling on at least one subject — Joyce Lynn Evans.

Concurring are the 600 youngsters at the Dr. Albert Schweitzer school, the school's teachers and leaders of the Magnolia School District.

Joyce Lynn was the popular choice of all to represent the school and the district during a five-day transcontinental pilgrimage recently after the school had won a special Freedoms Foundation award.

Joyce Lynn is 11 years old and the daughter of Mr. and Mrs. Jack Evans. Mr. Evans is a Nortronics Anaheim electrical maintenance man.

Joyce's school has won two Freedoms Foundation awards. The first was in 1962. Joyce, then in the second grade, wrote a winning essay about Nathan Hale. Last year she won the George Washington theme speech contest, a part of the program which has earned her school a third Freedoms Foundation award nomination.



TRIP TO REMEMBER—Mr. and Mrs. Jack Evans look over mementos of a trip daughter Joyce Lynn made to Washington, Valley Forge and other points. Youngster was selected by students and teachers at her school to make trip in conjunction with Freedoms Foundation Award school won. Joyce Lynn is outstanding student, has written prize-winning essays, and serves as a Student Council officer.

An Honor Roll student, Joyce was the school's Student Council recording secretary in her fourth school year. Last year she was vice president of the same group. This year she has been nominated for Student Council president.

Joyce Lynn and Mrs. Jean Restek, a teacher, were selected to

make the pilgrimage in conjunction with the 1965 award. They visited the nation's capitol, called on the district's congressional representative and toured key points, including the White House. They also visited Fredericksburg and

(See FREEDOMS, page 6)



## Out of California's Past:

# The Hunts Help Restore Glories Of Fabled Stagecoach Inn

Most of the residents of the fast-growing Conejo Valley are looking to the future as they move into the new homes which are beginning to line the tree-dotted hills.

But several long-time Conejo citizens, including Mr. and Mrs. Orville Hunt, are making sure that the area's fascinating past will not be neglected in that future.

The Hunts were among the first to contribute recently to the restoration and rebuilding of the Stagecoach Inn, which was built in Thousand Oaks in 1876 and served as a stage line depot until 1901.

### Founder's Secretary

Mr. Hunt, Northrop Norair director of Banking and Credit, and his wife, Patricia, who was Jack Northrop's secretary at the time of Mr. Northrop's retirement, have lived in Thousand Oaks for several years.

Their contribution to the restoration of the two-story landmark was made in the memory of Mr. Hunt's mother, Martha Lowsley Hunt, who spent much of her life in the Conejo area.

In 1884, at the age of 9, Martha Lowsley and her family moved to Santa Barbara from Lynchburg, Virginia. In 1902, she married Walter LeRoy Hunt, a Santa Barbara mercantile businessman. A few years later, Orville Hunt was born.

"I first remember the Stagecoach Inn as it looked around 1911 or so," Mr. Hunt said.

"We kids (there were four brothers) would take the train to Camarillo from Santa Barbara, and grandfather would pick us up in a buggy and take us to his ranch."

Grandfather was Richard Orville Hunt, owner of Salto Ranch, in the heart of the Conejo Valley. Salto Ranch



HISTORY TAKES A TOLL—Orville Hunt (left) with Dr. Michael Hagopian, president, Conejo Valley Historical Society, evaluate damage to windows of Stagecoach Inn as they contemplate the many needed repairs which will be made to establish the Inn as a museum to help bring back some of its past glories.

later became known as Hunt Ranch. Most of the property today is known as Lynn Ranch.

### She Sets Precedents

Martha Lowsley Hunt established some "firsts" in her early days in California.

She became the first woman employee in Santa Barbara County history, at the age of 14. After her marriage, she became the county's first licensed woman driver; and only the third woman driver in the state.

Her husband died in 1923, and Mrs. Hunt continued to operate his business, Hunt Mercantile Company, until 1932.

In that year, she moved to the ranch to stay, living there until 1962, when she died at 87.

Even the loss of the original ranch house to a 1946 fire didn't keep her away. Because of the recently ended war, there was a shortage of building materials, so Mrs. Hunt purchased

two surplus buildings from the U.S. Army; then moved them onto the property.

Also contributing to the restoration of the Stagecoach Inn have been Oswald A. Hunt, Orville Hunt's brother; and Mr. and Mrs. Robert W. Hunt, jr., son and daughter-in-law of the late Robert W. Hunt.

The Hunts made their gifts in a ceremony conducted by the Conejo Valley Historical Society, a nonprofit group organized two years ago. It has more than 250 members.

At the ceremony, the inn was opened to the public for the first time since it was moved about 200 yards from its original location. It was moved last year because of road construction through the original site.

"There's a lot of work ahead," Mr. Hunt said. "The inn was closed up for a long time, and most of the windows are broken, and the floors are warped."

## Interested in Europe Tour? Attend NRC Nov. 2 Meeting

Hawthorne area personnel interested in an NRC-sponsored European tour next year (May 18 to June 7) are invited to attend an organizational meeting set for 7:30 p.m., November 2 at NRC Clubhouse, Hawthorne.

Tour officials will show mov-

ies, answer questions and accept reservations.

Options available include roundtrip air fare (\$325) only or one of two continental tours, Southern Europe (\$350) or Scandinavia (\$375). A \$100 deposit is required for each reservation. Personnel Activities offices have tour information.

## Wolfe Named Editor Of The Northrop News

Stewart J. Wolfe has been appointed editor of the Northrop News it was announced by Norman Warren, corporate director of Public Relations and Advertising.

He succeeds Charles Ramsey who assumes new duties with the Public Relations department in Beverly Hills.

Wolfe has had long experience in both public relations, merchandising and company publications. He comes to Northrop from the Jam Handy Organization in Detroit where he was editor of *Communication Central*, dealer management publication for the Chevrolet Division of General Motors.

Other experience includes sales training, merchandising and employee communications with Ford Motor Co., American Motors Corp. and Parke, Davis & Co.

He is a former president of the International Council of Industrial Editors and an electrical engineering graduate of Purdue University.

## Company Helping Train Air Force Officers In Management Techniques



A DAY IN THE LIFE OF—Judy Lockwood, Product Support secretary at Norair, draws chuckles as she outlines daily schedule for four Air Force officers taking part in Education With Industry program at Northrop. They are, from left, Captains Daniel G. McIntosh and Joseph A. Pucci, First Lieutenant James B. McCabe, and Captain Conrad J. Luecke. Officers will work through Northrop divisions and facilities during their 10-month stay at Northrop.

A comprehensive 10-month training program stressing industrial planning and procurement executive development is now under way within Northrop for four Air Force career officers.

They are Captains Conrad J. Luecke, Daniel G. McIntosh and Joseph A. Pucci and First Lieutenant John B. McCabe.

The officers are participating in the Education With Industry Program sponsored by the Air Force Institute of Technology and conducted by Northrop and other participating firms.

### To Develop Understanding

Basic objectives of the training are to increase individual competence in the understanding of aerospace management principles, policies, planning, procedures, problems and problem-solving techniques.

This will be accomplished by allowing the officers to work for varying periods of time in many functions and organizations, taking part in activities and assuming some responsibilities.

Toward this end the officers will work throughout Northrop facilities, at the Corporate office and go out to visit field offices and distant operating facilities.

Each Northrop division will participate in a part of the program.

Captain Luecke is a graduate of Albion College (BS in chemistry) who entered the Air Force in 1954. He has served as a crew commander on KC-97 and KC-135 aircraft.

His last duty assignment was as a KC-135 simulator instructor.

### Second Assignment

Captain McIntosh is returning to Northrop for his second duty assignment. From 1958 until 1961 he was a member of the AFPR staff as an auditor. He has held other auditor posts since graduating from Officer Candidate School in 1956. He is a graduate of California Western University (BA accounting) and a former Air Force enlisted man.

Captain Pucci was also an Air Force auditor, serving at Patrick and Goose Air Force Bases and the Air Force Academy. He entered the Air Force in 1961 following his graduation (BA business administration) from the University of Minnesota.

Lieutenant McCabe holds a degree in Marketing from Oklahoma State University and entered the Air Force in 1964. He was a construction contract administrator and deputy chief—Procurement Division at Selfridge Air Force Base, Michigan, prior to being accepted for the Air Force Education With Industry program.

## Glenn Lord Honored by NSIA

Glenn R. Lord, Northrop Corporation vice president-Marketing, has been named to serve on the Executive Committee of the Los Angeles Chapter of the National Security Industrial Association.

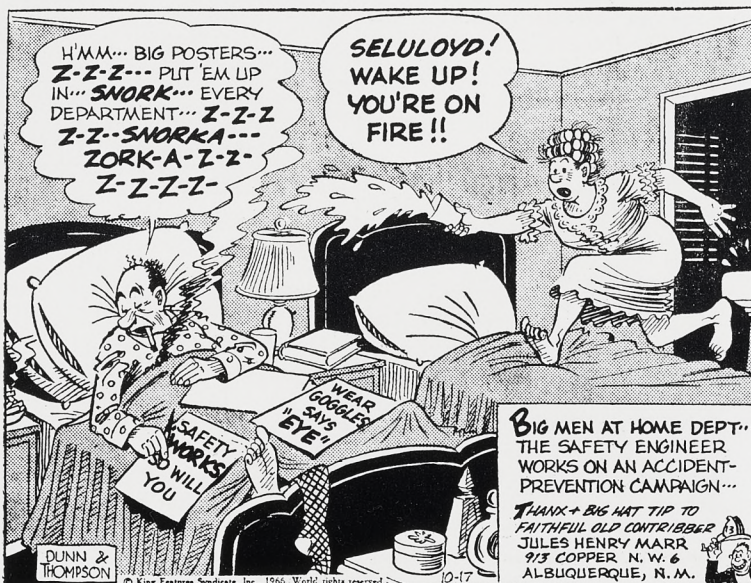
His term of service began this month and will continue until next October.



A SYMPOSIUM ON TITANIUM provided the material for a report issued by the Defense Metals Information Center. The symposium, held by Northrop Norair in March, brought together several experts on titanium and its uses. Dr. E. B. Mikus (left), chief of Norair Materials Research, and Bret Calfin (center), Materials Research engineer, review copies of the report with E. W. Cawthorne of the DMIC. Dr. Mikus chaired the titanium symposium.

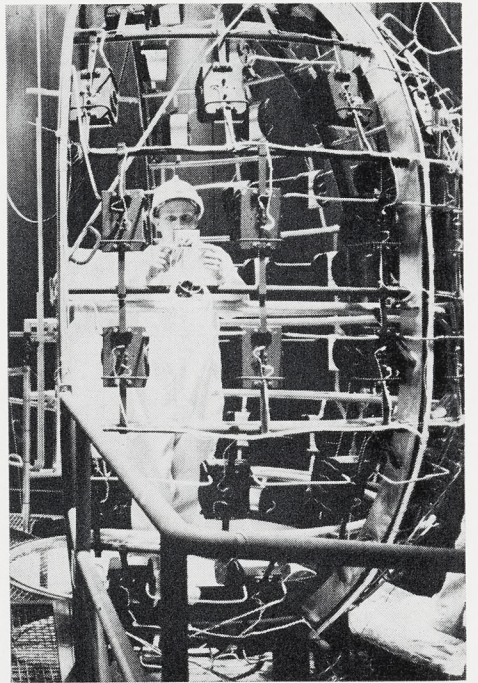
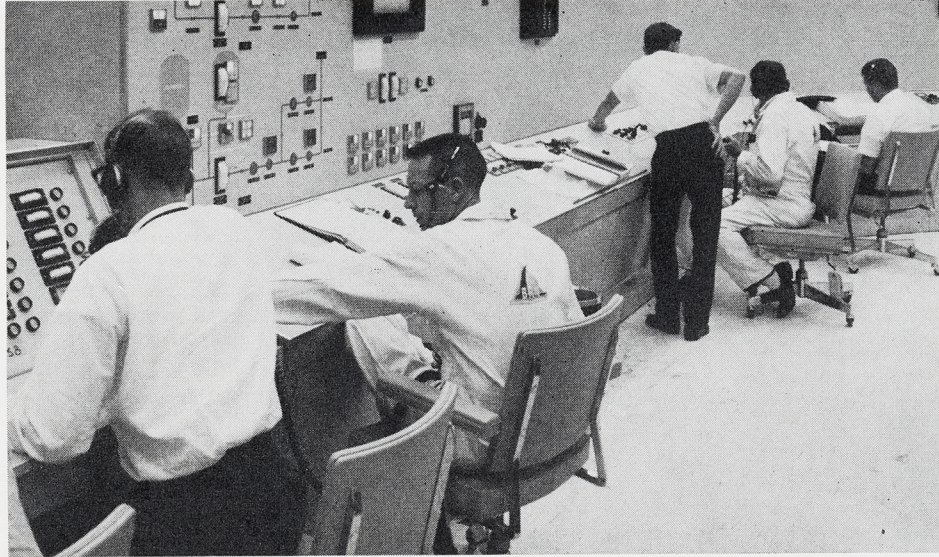
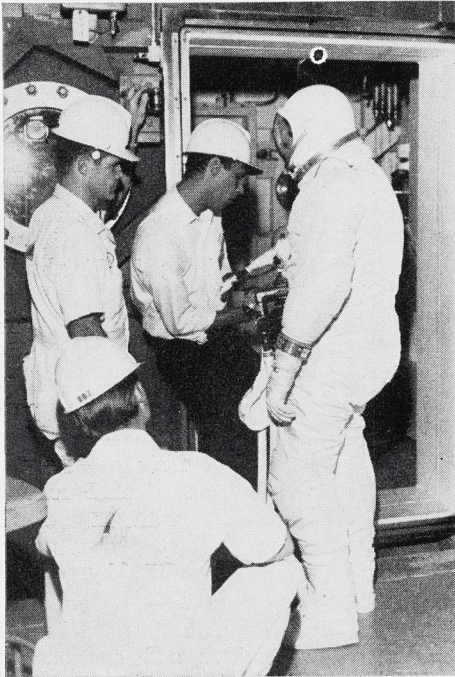
## THEY'LL DO IT EVERY TIME

By Jimmy Hatlo



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LAMAR CALDWELL, BRN vacuum technician (above), along with other BRN employees, operate control panel for space chamber at NASA's Manned Spacecraft Center, Houston, where BRN has support contract. At right, Clarence Blume, an electronic technician in the Experimental Mechanics Laboratory, adjusts microphone inside space chamber. At left, other BRN'ers check space suit controls prior to test subject's entry into test chamber.

## LUNAR SIMULATORS

# How High the Moon? Take a Tour of BRN

The moon is no closer to Houston than it is to the rest of the earth, but you'd think it was, after a tour of NASA's Manned Spacecraft Center.

From its outdoor simulated lunar surface, to its Crew Systems Laboratory, where space clothing and survival gear are tested, the MSC is clearly moon-oriented.

Helping to operate these facilities, and others at the Center, is Brown & Root-Northrop (BRN), a joint venture of Brown & Root Inc. of Houston and Northrop Corporation.

BRN holds the Operation and Maintenance Support Services (OMSS) contract for the Center. The two corporations formed BRN in 1964, and entered the operations contract with NASA in December of that year.

As might be presumed in a joint venture, BRN is composed of Northrop personnel, Brown & Root employees, and those who were hired after the venture began. They officially are BRN employees. In addition, a separate subsidiary (Darius Field Facilities) fulfills the maintenance portions of the contract.

BRN policies are governed by an executive board, similar to a board of directors, composed of three officers from Northrop Corporation and three from Brown & Root Inc.

BRN has nearly 650 employees.

Northrop is represented at BRN by 10 Northrop Space Laboratories men, headed by Harry P. Clagett, deputy project manager. The BRN project manager is Harry Hutchens of Brown & Root.

Other NSL personnel at Brown & Root-Northrop are, listed alphabetically:

Frank Holt, assistant technical supervisor, Space Environmental Simulation Laboratory (SESL); Don Knittle, assistant technical supervisor, Experimental Mechanics Laboratory (EML).

W. B. Kurz, supervisor, Personnel and Industrial Relations; Charles Martin, senior engineer, Crew Systems Laboratory (CSL); Carlos Montero, assistant technical supervisor, CSL.

Tom Overton, senior quality engineer, Quality

Control; Bruce Vernier, technical supervisor, EML; Edward Zick, Contracts supervisor; and Bill Zimmerman, supervisor of Accounting and Finance.

BRN with assistance from appropriate NASA personnel, operates and maintains the Crew Systems Laboratory, the Experimental Mechanics Laboratory, the Space Environmental Simulation Laboratory and the Thermochemical Test Area.

The CSL is part of the MSC Crew Systems Division and operates equipment used in testing and evaluating life support systems utilized in manned space flight programs. CSL also prepares and maintains test facilities and equipment used in defining flight equipment tolerance to the acceleration experienced in space flights.

The EML supports and is a part of the Center's Structures and Mechanics Division in the mechanical evaluation and qualification of spacecraft assemblies, components, test specimens and support equipment, utilizing dynamic and static testing methods. The EML also provides engineering and technical assistance in test preparation, operation and disassembly, including the gathering and presentation of data.

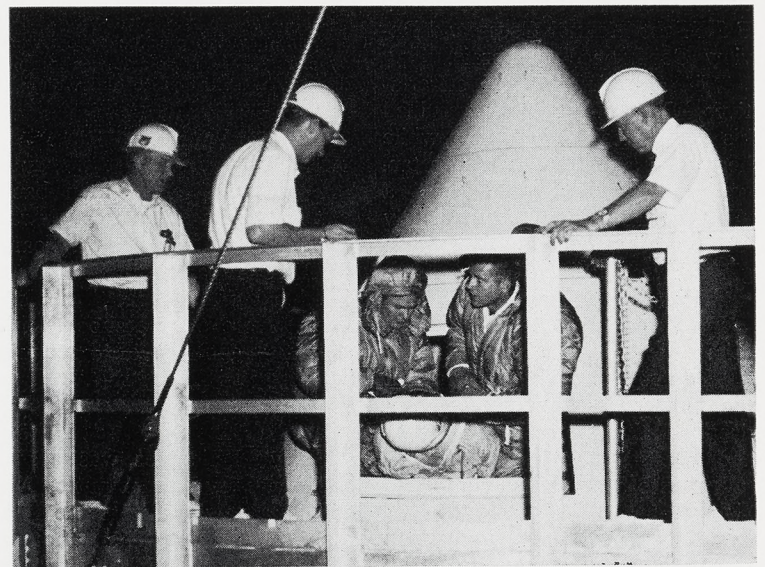
The SESL tests, analyzes and evaluates spacecraft, spacecraft systems and subsystems, and components and test articles under simulated space environment conditions.

The SESL operates and maintains the space simulation chambers and other equipment required to simulate space conditions. The group also provides engineering and technical assistance in test documentation preparation, test planning, installation of test equipment, instrumentation, data gathering and presentation, and the presentation of reports.

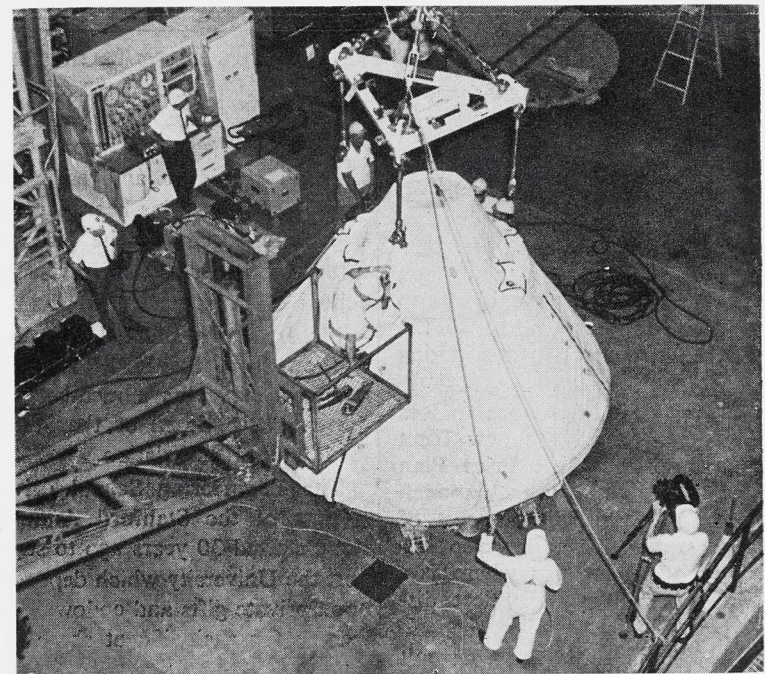
The free world's largest vacuum chamber is in the SESL area. The chamber, 120 feet high and 65 feet in diameter, simulates a vacuum at 500,000 feet. It also recreates the thermal and solar radiation conditions encountered in space flights and on the lunar surface.

The Thermochemical Test Area personnel

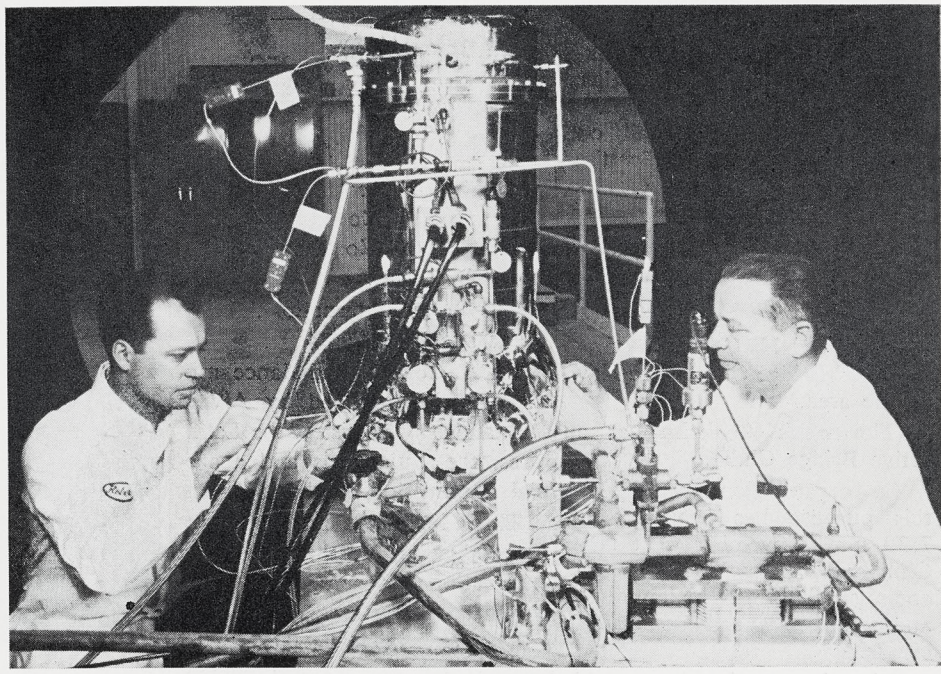
(See HOUSTON, page 5)



APOLLO COMMAND MODULE (below) is prepared by Brown Root-Northrop employees for installation in chamber 'A' of Space Environmental Simulation Laboratory (SESL). Within the SESL (above) a rescue drill is conducted using techniques developed for three-man spacecraft which will make the U.S.'s first manned trip to the moon.



WORKING IN NASA MICROBIOLOGY laboratory, Rosemary Van Norden (left) and Theran O'Bryant of BRN Biomedical Support section prepare sterile material for test. Nearby, in Thermochemical Test Area Systems (TTA) laboratory (photo at right), BRN technicians give fuel cell once over thoroughly.



TTA personnel participate in development, evaluation and qualification testing of propulsion, pyrotechnic and electrical power systems and subsystems.



## Air Force Captain Praises Company's F-5 Life Saving Ejection Device

"All of my equipment worked exactly as advertised."

There are at least two votes cast in favor of this as the world's "sweetest phrase."

One is cast by Captain Jay Paulsen, USAF, who issued it. To him it was a possible life and death proposition. It summed up his experiences in ejecting from a Northrop-built F-5 after being hit by enemy fire in Vietnam and his subsequent rescue.

The other vote is from thousands of Northrop employees and others who contribute to making the F-5 the type of aircraft such a phrase can be attributed to.

Captain Paulsen recently returned from Vietnam to attend an F-5 Flight Manual Command Review Conference at Norair.

With a minimum of superlatives, Captain Paulsen described his experiences which began while he was in a shallow dive on a target in Vietnam and felt a "WHOOMP" and immediately lost power in both of his F-5 engines.

### Plane Hit, Power Fails

His report went something like this:

"I don't know what hit me, but the power failed completely. I dropped the stores (armament) and headed toward the water. I pulled into a powerless climb and ejected.

"Everything seemed to happen slowly, although a ground observer said it was over quickly.

"I watched the canopy rise and leave the aircraft. The ejection seat began moving. There was no shock, it seemed to accelerate



"EVERYTHING WAS OVER QUICKLY"—Captain Jay Paulsen, USAF (with model), explains how F-5 ejection system worked perfectly for him following direct hit by enemy fire in Vietnam. Listening, from left, are Gaylord Anderson, Norair director of Field Service and Training, Colonel Philip Hallan, USAF, and Major Wayne Jenkins, USAF. Visitors were on hand for F-5 Flight Manual Command Review Conference at Norair.

slowly. I went straight up until clear of the aircraft, then back until I was face upwards. I was separated from the seat. I heard a WHOOSH and the parachute played out of the bag, then blossomed. There was no shock. I hit the water, got free of the chute and climbed into my raft."

### Needed Proper Hoist

Captain Paulsen described how a "Huey" helicopter was above him in a very few minutes, but had to pull away due to the lack of a proper hoist. Then another helicopter appeared, dropped a hoist and pulled him aboard.

"Within 15 minutes of the time I hit the water I was on my way back to the base," Captain Paulsen said.

Captain Paulsen's final statements also indicate his interest in flying the F-5 in Vietnam.

"My home is in Long Beach, so I'm glad to be able to attend this conference. However, I'm anxious to go back," he said. "All the fighter pilots over there want to get into the F-5 and I might not have a job, if I stay away too long.

"The F-5 has a record of receiving less hits from ground fire than any other jet aircraft involved in air-to-ground operations. Further, when we meet on our terms, we can 'wax' any other fighter in the area. We feel the MIGs are avoiding us," he concluded.

## Top Fighter Pilots Attend F-5 Meeting

Experience was readily apparent early this month when an F-5 Flight Manual Review Conference was staged at Northrop Norair.

This conference hosted by Product Support and attended by representatives of organizations flying and supporting the F-5 around the world, was held to review operational requirements and recommend changes to the pilot's flight operating instructions for the F-5 family of aircraft.

Attending were some of the world's finest fighter pilots, including one past and one present member of the 10th Fighter Command Squadron, USAF, flying the F-5 in Vietnam.

The former member was Lieutenant Colonel Alfred Hopkins who now commands the 4441st Combat Crew Training Squadron at Williams Air Force Base, Arizona, the group which trains F-5 pilots.

### Flies Against Viet Cong

In from Vietnam for the conference was Captain Jay Paulsen who flies against the Viet Cong as a present member of the 10th FCS.

And the four Norair men from Product Support assigned to write the F-5 Flight Manual, also in attendance, have an aggregate of 86 years of military flying to their credit, including 23,600 aircraft flying hours and 401 combat missions. They are Bob Leudeka, Bill Carter, Gene Derrickson and Hank Cervantes, who have the responsibility of preparing all of the Flight Handbooks for Product Support's Publication group.

Ed Dock of the Air Force's Aeronautical Systems Division, AFSC, was conference chairman.

## VNAF Vets Arrive At Williams AFB For F-5 Training

Veterans of Vietnam's long fight for freedom have arrived at Williams Air Force Base, Arizona, for flight training in Northrop-built F-5 fighters.

They are 33 Vietnam Air Force (VNAF) officers who have logged many hours of combat time against the Viet Cong flying propeller-driven Skyraiders.

Over the next six months the pilots will learn techniques of aerial combat with supersonic F-5's, the first jet fighter to be programmed for use by VNAF squadrons.

Nguyen Coa Ky, Vietnam prime minister and commander of the VNAF, recently announced for the first time plans for equipping VNAF units with the Northrop F-5. (Northrop News, September 28).

Conclusion of the current training program, scheduled for next April, is expected to coincide with the delivery of the first squadron of F-5's for VNAF use.

### More to Arrive Later

This is actually the first contingent of VNAF trainees expected of Williams AFB. Later this year airmen and noncommissioned officers from the VNAF will arrive to enter a detailed maintenance and ground crew training effort.

While at Williams AFB the VNAF elements will be assigned to the 4441st Combat Crew Training Squadron.

A majority of the officer-instructors in this organization are veterans of Vietnam combat flights during the United States Air Force "Skoshi Tiger" evaluation of the F-5. Lieutenant Colonel Alfred Hopkins, 4441st CCTS commander, is a veteran of this effort as well as a former commander of the 10th Fighter Command Squadron which is now flying the F-5 in Vietnam in an operational environment.

The VNAF pilots are slated for a minimum of 55 hours of flying time at Williams AFB. This will include everything from jet

(See VNAF, page 5)

## Here's When To File For Medicare Benefits

Persons who are nearing 65 have been reminded that they may file for Medicare benefits up to three months before their 65th birthday.

The reminder was issued by the Social Security Administration's office in Inglewood.

A person may continue to work full time and still be eligible for Medicare payments, the news release said, as earnings do not affect eligibility.

Further information may be obtained by calling Field Representative Kenneth B. Judy at 673-5222.

## STEAK FRY DEADLINE

Friday is the deadline for procuring tickets to the Northrop Wanderers steak fry and campout November 5-6 at Nojoqui Falls Park.

Camping fees are \$1 per unit. Steaks will sell for \$1.50 for adults, \$1 for children. This includes all the trimmings. Families will each bring one pie for dessert.

Steak fry tickets may be obtained from Personnel Activities.

## Want To Save Money On A Shiny New '67? Here's A Special!

Has one of the new 1967 automobiles caught your fancy?

If so, Northrop Personnel Activities offices may be able to help you save money on your purchase. And Northrop Credit Union can finance the deal for you, again at a saving over most methods.

Personnel Activities offices have copies of the new Fleet Discount Purchase Price Plan catalogues, listing each model, its basic cost and the cost of accessories. There are also listings of dealerships where you may buy under the fleet discount plan.

Here's how it works: consult the catalogues and decide on the make and model you like; select the dealer; pick up an introductory card to the dealer; visit the dealer and complete your purchase; then call on Northrop Credit Union for the best loan terms available.

## Bridge Club Fans To Form Club Nov. 4

Numerous requests have been received by NRC to reactivate the NRC Bridge Club in the Hawthorne area.

(Nortronics Anaheim has an active Bridge Club).

An organization meeting for this purpose has been set for 7:30 p.m. November 4 at NRC Clubhouse, Hawthorne. Acting commissioners will be appointed and plans mapped for future events.

Other information is available through Don Kohler, ext. 2486, at Norair.

## Roy Jackson to Guide Stanford Fund Appeal

Roy P. Jackson, Northrop Norair vice president and assistant general manager, has been named regional chairman of the Annual Fund for the Stanford University School of Engineering.

Mr. Jackson graduated with distinction from Stanford in 1941 and now serves as a member of the executive board of the Stanford Alumni Association.

The Engineering School drive is part of the Stanford Annual Fund started 30 years ago to support the University which depends upon private gifts and endowment income for a significant share of its operating funds.

## Annual All Northrop Holiday Dance Plans Announced by NRC

Northrop Recreation Clubs have selected November 26 for the annual all-Northrop Holiday Dance this year.

The famed International Hotel is the site.

Entertainment, and dance music, will be provided by Alvino Ray and his Orchestra, the Latinaires, the Guideposts and a special intermission combo.

Three ballrooms have been reserved just for Northrop folk, the International Room, the Rose Room and the Blue Room.

Tickets, now available at all outlets, sell for \$2 per person. Parking will be \$1 or 50 cents with validations.

## Appoint Llewellyn F. Stanton To AIA Western Asst. Mgr. Post

The Aerospace Industries Association has appointed Llewellyn F. Stanton, 25-year veteran of the aerospace industry, assistant manager of its western office in Los Angeles, Karl G. Harr, jr., AIA president, announced.

In this position, Stanton will assist Ken Ellington, who since May 1965 has headed AIA's western office. He will be responsible for coordinating the work of the various AIA committees meeting on the west coast.

Stanton comes to AIA after 25 years with the Northrop Corporation where he was involved in budget administration, accounting

systems, long range facilities planning, contract administration and since 1964 has been suggestion awards analyst.

He is a mechanical engineering graduate of Johns Hopkins University and spent one year at the Harvard Graduate School of Business Administration.

One hundred percent of the employees of the White House in Washington now are buying Savings Bonds on the Payroll Savings Plan. Many other governmental units, both civilian and military, have exceeded the 90 percent mark.

## Brothers Celebrate 25 Yr. Award



SHARING THE HONORS—Norair's Carlisle brothers, C. B. (Parks) and Shelley, help one another pin on Northrop's 25-year pins. Brothers were first to join Northrop on same day, although other brothers among employees have received 25-year pins previously.



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

# Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

## For Sale

**Exec. Home**, 4-bdrm. inc. lge. master bdrm., 1 1/2 baths, nearly 2100 sq. ft., 2-car gar., lge. fireplace, elec. kitchen w/bltins, cpts., dps., within walking dist. of Northrop, 6 1/2% take over loan avail., \$34,950. Hawthorne, PL 6-9659. A

**Pups**, miniature Dachshund, AKC champ. stock, 2 black males, 1 red female, males, \$60; female, \$70. Torrance, DA 5-7806. A

**Accordion**, Scandalli, 120-bass, w/case, \$100. Box 2101. A

**Lense**, Nikor, 28mm for Nikon F camera, never used, cost \$179, \$90. Box 2102. A

**Cub Scout Uniform**, size 8, complete, worn twice, \$6. Torrance, FR 9-5690. A

**G/P Sprite**, 1962, w/1965 eng., many extra parts, \$750. Port. Bend, 377-2921. A

**Land**, 1 1/4 acre parcels, improved, lake view, Lake Isabella, \$2800. Gardena, 635-3127. A

**Interior**, complete, for 1964 Chev. Super Sport, incl. b/seats, rear seat w/speaker, arm rests, side panels, cpts. & console, fits any 2-dr. Chevy from 1959 thru 1964, sedan or h/top, \$100. Redondo Bch., FR 8-2055. A

**Thunderbird**, 1964, all power, 1-owner, \$2250. Camarillo, 805-482-6740. A

**Volkswagen 1300**, 1965, factory air cond., radio, seatbelts, \$1550. Simi, 526-8927. A

**Shop Manual**, 1965 Dodge Dart & Coronet, \$2. Inglewood, 671-0109. A

**Honda**, 1966, 160cc Scrambler, 2500 miles, \$425. P.V. Pen., FR 7-8533. A

**Movie Camera**, 8mm Keystone, 3 lens turret & projector, \$50. Inglewood, 759-8920. A

**Cadillac**, 1956, Coupe De Ville, \$395. Rolling Hills, FR 7-3487. A

**Ford**, 1959, 4-dr. station wagon, 6-pass., V-8, r/h, Fordomatic, orig. owner, low mileage, \$475. Gardena, 676-0432. A

**Surfboard**, Roberts, 9'3", \$55. Westchester, 670-4702. A

**Porsche**, 1963 coupe, AM-FM Becker, chrome wheels, orig. owner, \$2650. La Habra, 691-4986. A

**Plymouth**, 1957 4-dr., stick, new battery, \$125. Brea, 670-2762. A

**Rambler**, 1960, Classic, 4-dr., r/h, \$425. L.A., 272-2659. A

**Piano**, maple spinet, \$400. Los Alamitos, 431-4010. A

**Honda**, sports model S-90, 1-yr.-old, 3000 miles, luggage rack, dual mirrors & helmet, \$325. San Pedro, TE 3-4272. A

**House**, 5-bdms., extra lge. liv. rm. & den, 2 1/2 baths, 2 fireplaces incl. 1 w/full wall P.V. stone, 2700 sq. ft., cpts., dps., elec. kitchen, \$39,950. La Habra, 691-5166. A

**Drapes**, 29 yds., traverse, hand-blocked, lined cost \$300, \$50. Long Bch., GA 2-5074. A

**Dining Room Set**, old-fashioned buffet & lge. table w/6 chairs, \$125. Inglewood, 674-1796. A

**Acreage**, 5 acres near Rosamond, \$975 dn. & take over pymts. at 6% interest, \$2975. Torrance, FR 8-1026. A

**Band Saw**, 12" Craftsman, w/1/2 h.p. motor & stand, cost \$150; \$85. Huntington Bch., 714-962-3597. A

**BSA**, 1965, 175cc, 1900 miles, \$325. Inglewood, OR 2-7628. A

**Bedroom Suite**, dble. bed, box springs & mattress, mirrored chest, comb. chest & wardrobe, night stand, antique, \$75. Playa del Rey, 823-1910. A

**Motorcycle**, 1962, Matchless, 650cc twin, 4-spd., stock, \$550. Hawthorne, 672-1576. A

**Tires**, 4 retreads, 14 x 900, \$10. Wilmington, TE 4-7188. A

**TV**, 21" Packard Bell, \$15. Hawthorne, 675-7955. A

**Bookcase**, w/adjust. shelves, mahogany, dble. glass door, \$35. Westminster, 714-897-0597. A

**Motorcycle Tires**, 2 w/tubes, 250-16 Knobbies, \$12. Hawthorne, 679-5371. A

**Refrigerator**, Philco, 5 cu. ft., \$35. Manhattan Bch., 545-1662. A

**Volvo PU 544**, 1960, good mech. cond., needs some body work, \$250. Playa del Rey, 823-1962. A

**Guitar**, Kay, w/case, \$60. Hawthorne, OS 6-4272. A

**Radio**, Citizens Band, 5-watt transceivers, 2 units made by I.C.C., 5 crystal channels, crystals & stainless whip antenna, cost over \$350; \$150. Hollywood, HO 5-6966. A

**Guitar**, Kay, & case, \$35. Torrance, DA 6-8273. A

**Ford V-8**, 1955, r/h, smog device, auto. trans., 4-dr. sedan, \$95. Wilmington, 834-2452. A

**Honda**, 1965, 305 Superhawk, 2 helmets, extras, \$500. Torrance, 326-6195. A

**Volkswagen**, 1965 Square Back 1500S, \$1800. Anaheim, 714-828-3718. A

**Auto**, 1925 Star Sport Touring, completely restored, incl. spare rebuilt eng., \$1800. Lancaster, 805-942-0576. A

**Coin Collection**, U.S. & foreign, proof, mint, gold, \$190. Box 2103. A

**Guitar**, elec., bass & treble switch, \$45. Manhattan Bch., FR 4-0750. A

**Bonneville**, 1966, fully equipped, \$3500. Garden Grove, 530-3242. A

**Camper**, 8' slideon, 3 mos. old, oak paneling, table & ice box, cost \$650; \$550. Bellflower, ME 4-1761. A

**Pontiac**, 1959, 2-dr. h/top, \$500. Hawthorne, OS 6-7368. A

## For Sale

**Home**, 3-bdrm., 1 1/2 bath, fam. rm., cpts., dps., dble. gar., patio, landscaped, fenced on 1/3-acre lot, 1 1/2 mile from Ventura Div., 5 1/4% existing FHA, \$18,500. Newbury Pk., 498-3791. A

**Home**, 2-story in Simi, 4-bdms. & den, 2 baths, cpts., dps., patios front & rear, used brick landscaping, fences, 5 1/4% G.I. resale, will assume 2nd if required, \$150 mo. lease or \$23,500. La Palma, 805-527-0212; 714-827-1958. A

**Cabin Cruiser**, 18 1/2', 7' beam, 3' deep, bait tank & pump, comp. & control cables, life jackets, C. G. requirements, 50 h.p. Johnson elec. start., sleeps 3, trailer, \$1700. Torrance, DA 7-2831. A

**El Camino**, 1964, auto. trans., \$1500. L.A., OL 1-2244. A

**Furnace**, 105,000 btu GE forced-air, 2-spd., gas, 6 mos. old, under warranty, \$125. Diamond Bar, 595-5877. A

**Austin Healey**, 1960, Sprite, r/h, new battery, paint, good tires, \$600. Rolling Hills Ets., 377-0114. A

**House**, in Torrance, 3-bdrm., 2 baths, near shopping & schools, 5 1/4% mortgage, \$141 mo. or \$26,950. P.V., 377-9666. A

**Golf Clubs**, 4 woods, 1, 3, 4, 5, D2, reg. shaft, Northwestern, \$25. Anaheim, 535-3711. A

**Jeep**, 1952, wag., 4 wd + od, r/h, sand tires, incl. 2 new spare tires, \$800. Anaheim, TA 8-1511. A

**Camper**, 1966 Grishman, w/refrig., 2 beds, table, lots of storage & closet space, 54" high, used once, \$425. Lawndale, OS 9-8525. A

**Chevrolet**, 1960 Bel-Aire, 4-dr. sedan, r/h, V-8 auto., \$375. W.L.A., 477-2342. A

**Encyclopedia**, Standard, washable binding, cost over \$300; \$150. El Segundo, 322-7269. A

**Buick**, 1961, Le Sabre station wagon, needs body work, \$535. Lawndale, 371-3919. A

**Mobile Home**, Universal 1957 8' x 40' w/awning, near Northrop, \$1800. Hawthorne, 754-7289. A

**Rifle**, chambered to 300 Savage w/powerful Mauser type action, custom-stock, Williams peep sight, & swivel, \$55. Buena Pk., 213-UN 3-2769. A

**Bicycle**, Schwinn, 8-spd. racer, generator light & carrying rack, \$35. Huntington Bch., 714-842-6720. A

**Camper**, 1966 VW Sundial, all extras, \$2500. Hawthorne, 631-0615. A

**House**, 3-bdrm., located 2 blocks from Compton Jr. College, detached dble. gar., fenced backyard, \$18,500. Compton, NE 8-5610. A

**Dodge**, 1951, 4-dr. sedan, low mileage, 1-owner, new paint, \$125. Inglewood, PL 5-8158. A

**Bed**, dble., walnut, w/frame and half canopy, takes a standard dble. mattress & box springs, \$25. Sherman Oaks, ST 8-9709. A

**MGB**, 1966, h/top & soft top, wood Nardi steering wheel, wide wheels, r/h, orig. cost \$3300, w/out h/top & wood wheels, \$2395. Box 2104. A

**Archery Bow**, 35 lb., w/cover & quiver, \$20. Hawthorne, OS 6-3886. A

**Stereo Hi-Fi Components**, AM-FM tuner, dual amplifiers, dual preamps, dual cross-overs, 4 speakers, turntable, \$68. Hawthorne, 676-0418. A

**Go-Cart Frame**, all steel, welded construction, yellow, \$10. Torrance, 326-4898. A

**Bicycle**, boy's 24", American made, \$15. Torrance, FA 8-3306. A

**Sewing Machine**, portable w/attachments, \$15. Manhattan Bch., FR 4-4780. A

**Bicycle**, Royce Union, 10-spd. Derailleur, Italian-made, \$20. Lawndale, 679-2642. A

**T-Bird**, 1963, air cond., all power, take over pymts., \$1700. Orange, 714-532-1361. A

**Pin Ball Machine**, elec., fully auto., full size, has 7 balls, 2 flippers, spec. on & off switch, \$60. Torrance, 375-6467. A

**Decorator Grapes**, 24 - 2" bunch, color of your choice or 2-toned, \$15. Torrance, 371-1096. A

**Chevrolet**, 1958, 348 cu. in. eng. 409 rac. clutch, Muncie 4-spd., Hurst 4.56 posi., hvy. duty springs & shocks, stereo & tapes, p/s, p/b, radio, many other extras, \$1550. Inglewood, 677-1495. A

**Pontiac**, 1964 Tempest cpe., 327 V-8, 4 bbl., p/s, r/h, auto., new b & m Hydro, 28,000 mi, orig. owner, \$1250. Torrance, 325-9352. A

**Pontiac**, 1963 Tempest, 4-dr. sta. wagon, 4-cyl. stick, p/s, r/h, \$950. Downey, 861-4940. A

**Plymouth**, 1960, station wagon, \$650. Redondo Bch., 374-1124. A

**Ham Station**, Swan 120 SSB transceiver, Heath supply, speaker, field strength meter, turner SR 90 D mike, \$175. San Pedro, 833-9696. A

**Typewriter**, Underwood Touchmaster II, office type, \$125. Redondo Bch., 325-8340. A

**House**, 3-bdrm., den, 1 1/2 baths, in Hollypark, \$1750 dn., immediate occupancy, \$23,600. Torrance, 754-2286. A

**Surfboard**, 8'8", \$40. Torrance, 375-6071. A

**House**, 4-bdrm., family rm., 2 1/4 baths, 1 acre, horses O.K., near Northrop Ventura, \$35,000. Somis, 805-482-1186. A

**Yawl**, 30' Cregier, fully equipped, sleeps 5, \$5300. Manhattan Bch., 376-4002, 670-7208. A

**Avanti**, 1963, 295 h.p. V-8 w/stick Hydro-matic, full power, good tires, new shocks, recently tuned, \$2975 or \$1400 & take over \$66.84 mo. pymts. Hawthorne, 644-1958. A

## For Sale

**Chevrolet**, 1957 convt., many extras, 1-owner, \$1000. Torrance 835-5052. A

**House**, 2-bdrm., R-3 lot, in Inglewood, \$27,500. L.A., AX 2-9483. A

**German Shepherds**, 10, 6 wks. old, healthy, full-shepherd but no papers, \$10 ea. Torrance, 830-4265. A

**House**, 4-bdrm., 1 1/2 bath, fireplace, all elec. kitchen, dishwasher bltins, screened alum. patio, w/w cpts., fenced yd., \$26,000. Torrance, 834-2175. A

**Chevrolet**, 1957 Bel Aire, V-8 auto., r/h, good paint & tires, orig. owner, \$355. Fullerton, 871-1406. A

**Range**, O'Keefe & Merritt, gas, griddle, \$40. Gardena, 320-5720. A

**Refrigerator-freezer**, 14 cu. ft. Norge, 2-dr., \$65. Rolling Hills Ets., FR 5-8536. A

**Dark Room Equipment**, enlarger, contact printer, safe lights, trays, tanks & misc. items, \$80. Inglewood, 677-6348. A

**House**, 3-bdrm. & den, panel. liv. rm., dps., patio, 10 min. to Northrop, near schls. & fwy., \$21,900. Gardena, DA 9-2504. A

**Lamp**, blue opaque glass, orig. cost \$80; \$25. Rolling Hills Ets., FR 8-2190. A

**Amplifier**, Gibson, piggyback, 12" speaker, \$100. Redondo Bch., 376-5019. A

**Acreage**, 40 acres, 30 mi. south of Lake Isabella, mountain timber, rec. or investment, 10% dn., \$300 acre. Redondo Bch., FR 4-2345, 249-0185. A

**Ford**, 1957, Fairlane 500, eng. just o/hauled, p/s, p/b, r/h, w/w tires, \$395. L.A., PL 4-2784. A

**Pontiac**, 1963 G.P., f/pwr, fac. air, very low mileage, \$1895. Hawthorne, 675-4752. A

## Wanted to Buy

**Steno-Type Machine**, in fairly good working order & comparatively new, prefer Samsonite carrying case. Cypress, 828-5943. B

**House Trailer**, 8' wide, furn., must be reasonable. Torrance, 324-5422. B

**Belly Board**, plastic foam & fiberglass construction, in usable condition. Manhattan Bch., 545-6360. B

**Sewing Machine**, late model, brand name, in good condition w/attachments, reasonably priced. Harbor City, 325-4590. B

**Duplicating Machine** in good condition, spirit type not acceptable, must be reasonable. Lakewood, ME 3-6346. B

**Bicycle**, 20" boy's, any make, fair condition. San Pedro, 833-6045. B

**Wall Mirror**, 24x30, w/maple frame. Redondo Bch., FR 2-3827. B

**Stove**, apt. size, elec., Hawthorne, 676-7961. B

**Row boat**, unseaworthy, fiberglass or metal for children's playground. Torrance, 323-8089. B

## Rentals Offered

**Apt. 1 & 2-bdrm.**, unfurn., closed gar., pvt. patio, hot water & trash paid, \$95 & \$125 mo. Torrance, FR 5-0867, 320-7547. E

**Beach Apt.**, deluxe 1-bdrm., w/garage, cpts., dps., furn. 1 block from beach, \$125. mo. Hawthorne, 676-0237. E

**Apt. 2-bdrm.**, furn., gar., 5 min. from Manhattan Beach, 1 child O.K., \$130 mo. Hermosa Bch., 372-5985. E

**House**, 2-bdrm., in Manhattan Bch., stove & refrig., gar., encl. yard, patio, water & trash paid, \$140 mo. Palmdale, 805-947-4290. E

**Apt. 1-bdrm.**, furn. modern, walking distance to Northrop, \$90. Hawthorne, OS 6-4734. E

**Apt. lge. 1-bdrm.**, pool, patio, redecorated, near fwy., \$105 mo. L.A., 837-4036. E

**House**, unfurn., 2-bdrm., 2-bath, fam. rm., w/w cpts., dps., \$165 mo. Hawthorne, 377-0855. E

**Vacation Cabins**, Lake Gregory & Crestline, \$25 w/ends; \$60 wk. Venice, EX 1-2040. E

**House**, 1-bdrm., unfurn., fireplace, cpts., dps., bitin kitchen, gar., fenced yard, gentleman preferred, no pets, avail. Nov. 1, \$135. Manhattan Bch., FR 9-4766. E

**Apt. 2-bdrm.**, furn., 2 blocks from Norair, laundry facilities, \$150. Hawthorne, OS 9-7123. E

**Studio Apt.**, 2-bdrm., 2 1/2 bath, pvt. deck, sub. gar., cpts., dps., dishwasher, elec. bltins, near San Diego Fwy., adults, lease, \$180. Inglewood, 673-0615. E

**Apt. 1-bdrm.**, unfurn., all bltins, pvt. deck, lge. pool, ample sub. parking, near Northrop, \$125 mo. Lawndale, 679-2117, 670-6084. E

**Cabin**, Big Bear Lake, sleeps 7 to 9, \$18 w/ends; \$50 wk. Bellflower, TO 7-0662. E

**Mountain Home**, 2-bdrm., 3 hrs. from L.A., hunting, fishing, \$45 wk. Torrance, DA 4-3291. E

**Vacation Cottages**, Idyllwild, 1 & 2 bdms., fireplace, stream, patios, \$20-\$35 w/ends; \$45-\$70 wk. L.A., PL 4-5288. E

**Vacation Cabins**, Lake Gregory & Crestline, \$25 w/ends; \$60 wk. Venice, EX 1-2040. E

## Child Care Offered

**Will babysit** preschool age child at my home during day hours, have large fenced yard, 50¢ hr. Box 2105. G

## Child Care Wanted

**Woman** to come to my home to care for 3-month infant from 7:30 a.m. to 5 p.m. Box 2106. H

## Personals

**Housekeeping** work or babysitting wanted in Inglewood area. Inglewood, 673-1253. L

## Going my way?

### Rides Wanted

**7 a.m. — 3:45 p.m.**  
**Madison & 229th Place**, Torrance. Barbara Senter, Norair, ext. 2075, 326-7304. A

### 7:24 a.m. — 4:06 p.m.

**Century Blvd. & Normandie**, Los Angeles. Mel-lie Strand, Mariposa, ext. 4044, 757-2986, PL 5-9002. A

### 8 a.m. — 4:42 p.m.

**So. Brea & 430 W. Imperial**, Brea. Peggy Thomas, Nor. Anaheim, ext. 557. A

**Santa Susana or Thousand Oaks to Hawthorne**, Simi. Paul J. Schapp, Nor. Haw., ext. 613, 805-526-7767. A

### Rides Offered

### 8 a.m. — 4:42 p.m.

**Santa Susana or Thousand Oaks to Hawthorne**, Simi. Paul J. Schapp, Nor. Haw., ext. 613, 805-526-7767. A

### Personals

I would like to thank everyone for their kind remembrances during my recent illness. OTT STADLER. L

**Fly** new 1966 Cessna 150 commuters, \$7 per hr. wet, students welcome, also new 1966 Mooney Super 21, 185 mph cruise, \$19 per hour wet. Hawthorne, OS 6-6138, DA 5-5288. A

**Gratefully** acknowledging & thanking all of you for your kind expressions of sympathy in the passing of my mother. MARGARET (MAG-GIE) SOVIE. L

**Rider** wanted, 8 a.m. to 4:42 p.m. from Orange County Airport by air. Box 2107. L

**Small House** wanted or 1-bdrm. duplex or apt., ground level, \$70. or under for Northrop retiree, contact Welfare Coordinator, ext. 4786. L

**Anyone interested in chess**, the Chess Club meets on the 1st & 3rd Friday at 7:30 p.m., NRC Clubhouse & the 2nd & 4th at Western Airlines. Contact Personnel Activities office, ext. 2486. L

**Attn. Bowlers**. Those who have not been asked to bowl on one of our leagues, there are still many openings. Contact Bill Myerson, Norair ext. 4255, Dorothy Baldwin, Nortronics P.V. ext. 75-456, or Vi Jennings, Norair ext. 2492. L

**Room**, for rent w/breakfast kitchen privilege, new home, 1 mile from Plant 1, prefer swing-shift employee. Inglewood, 676-8833. L

**To our many wonderful friends** at Nortronics & Norair, our sincere thanks for the thoughtfulness & generosity during the recent bereavement of our beloved husband & father. SUZIE HOWE & SONS (MICHAEL, DARRELL & MARK). L

We wish to express our sincere appreciation for your expressions of sympathy at the recent passing of our wife & mother, Fern. PAUL & JACK GIBILISCO. L

### For Sale or Trade

**Ham Gear**, transmitter, 150W, 80 meters thru 6 meters VFO controlled & receiver, National, 270 80 thru 6 meters, \$300 or trade for 8' camper. Gardena, 327-8927. M

**Bar Stools**, 4, fibremold commercial wt., coral, molded fibreglass, swivel, stainless steel legs, full ht. backs, 28" seat height, cost \$55; \$25 ea. or trade for bar stools w/out backs. Redondo Bch., 376-9875. M

## Houston

(Continued from page 3)

participate in the development, evaluation and qualification testing of propulsion, pyrotechnic and electrical power systems and subsystems.

They also provide operational support during test programs. The Thermochemical Test Area Systems Laboratory is capable of performing analyses of liquid, solid and gaseous materials used in testing and evaluation.

Something new at the Manned Spacecraft Center is the Lunar Receiving Laboratory (LRL), to be completed late next year. BRN has the contract to monitor construction, which began in August.

The LRL, an area in which the Apollo spacecraft, astronauts and lunar materials will be isolated following their return from space, will be approximately 100,000 square feet in total area.

Within the LRL, everything will be quarantined, while the astronauts, their ship and everything they bring back will be examined, tested and monitored—all from a distance.

## Damman Chairs NSIA Source List Meeting

Floyd F. Damman, senior marketing representative at Northrop Norair, was chairman recently of a Washington, D.C., meeting on research and development source lists.

The meeting, on the preparation of the source lists, brought together for the first time men who have been working on the project since August.

The committee, called "Task Force No. 2," is sponsored by the National Security Industrial Association. It was organized by the NSIA Research and Development Advisory Subcommittee on Research Management, Regulations and Directives.

### Named In August

Mr. Damman was named to head the committee in August, when it was formed. Members have been studying the many requirements from individual Department of Defense and National Aeronautics and Space Administration procurement agencies, as they apply to source list information.

"Our purpose," Mr. Damman said, "is to simplify the situation as much as possible."

"This meeting presented our first opportunity for getting together since the Task Force was formed. There are some things you can't accomplish while working separately, and this joint meeting provides us with a chance to make some headway."

## VNAF

(Continued from page 4)

conversion flights to weapons delivery techniques and aerial combat maneuvers.

### They're All Experienced

Despite its intensive nature, the program for the VNAF pilots is actually shorter than that carried out for pilots from allied nations and even some Air Force officers. That's because the VNAF pilots are already experienced combat pilots, well schooled in combat tactics learned the hard way. This eliminates the need for a portion of normal training routines followed at Williams AFB with less-experienced personnel.

Throughout their Williams AFB training, VNAF personnel, both pilots and maintenance men, will utilize Northrop-built trainers and training equipment as well as actual F-5A's and F-5B's.

### Try A Real Bargain In Disneyland Tickets

Families looking for the entertainment "buy" of the fall season might do well to consider an adventure in Disneyland Friday night.

That's when the Association of the United States Army has reserved the whole works from 8 p.m. to 1 a.m. And Northrop families are invited to share in the festivities.

The total price is \$3.75 per person which includes admission and unlimited use of all Disneyland facilities for the rest of the night without charge. That is, except shooting galleries which will charge nominal rates.

Northrop's ticket outlets have tickets now.



Mr. Damman



## Computer

(Continued from page 1)

The basic approach by the Computer Development group was to intermix the concepts of logic design and circuit board layout and, through engineering redesigns attain desired results. Each apparent roadblock was eliminated by physical relocation or functional modification of the logic elements. By working closely together, the team achieved the goal in approximately six months of intensive effort.

Klein and his group working with Bert Swearinger, chief, Advanced Computer Applications, augmented this "hardware" development effort by developing a "software" complement of associated aids to programming. This consisted of the development assembly programs and a soon to be completed Fortran compiler.

The NDC-1051, which was demonstrated at the IEEE Aerospace Computer Symposium at Santa Monica, October 24 and 25, weighs only 29 pounds. Although on a par capability-wise with the IBM 704 which once occupied an entire room at the Northrop Engineering and Science Center, the NDC-1051 is about the size of the average briefcase.

Nortronics Division's computer breakthrough which reduces the cost to one-half of that produced by competitive companies was another first for the company.

Now, according to Mr. Klein, several other competitive organizations are utilizing the basic idea in their designs.

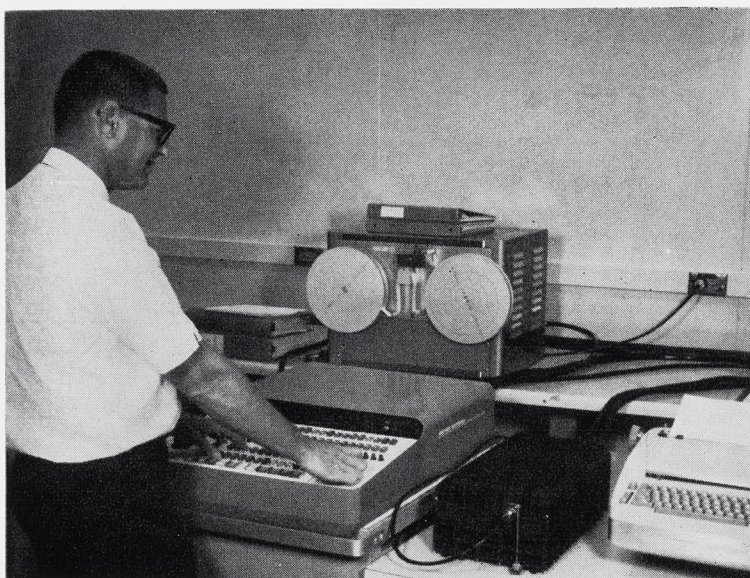
"But," he said, "to stay ahead we're working on advanced developments with which we hope to maintain our lead in compact computer design."

## Employees' Original Artistry Decorates Division Lobby

Northrop Nortronics personnel assigned to or visiting the Palos Verdes facility, as well as visitors, have voiced a strong approval of original oil paintings used as decor there.

Unknown to many is the fact the paintings are the work of Nortronics artists who paint as a hobby. Most are affiliated with the NRC-sponsored Art Club at Anaheim.

## Demonstrates NDC-1051 Versatility



LIGHTER MOMENT in the life of a computer. Ed Klein, chief, Computer Development, Nortronics, programs the NDC-1051 to play blackjack. The unit was demonstrated at the IEEE Aerospace Computer Symposium in Santa Monica on October 24 and 25, where it was one of the highpoints of interest.

## Golfers Fete Champions At Awards Banquet

Wayne Mathis and Roy Raymer in the regulation course event, Tony Piccirello and Chuck Chamberlin in the short course, and Ted Dezuine in putting are NRC summer golf champions.

Champions and potential champions were feted October 13 in the first annual NRC Awards Banquet held at the Western Avenue Country Club.

Mr. Mathis and Mr. Raymer worked overtime for their honors, taking the championship on the second hole of a sudden death event against Fran Connors and Warren Klauer. The two teams finished the 18-hole Green River Country Club playoffs deadlocked at 130 strokes (net each).

This event found winners of first and second rounds in summer Twilight Leagues eligible to compete for the over-all championship.

The short course championship fell to Mr. Piccirello and Mr. Chamberlin in playoffs held at the Inglewood Country Club.

Mr. Dezuine won the putting crown prior to Twilight League playoff rounds.

### Twenty Leagues Sponsored

Twenty leagues were sponsored by NRC during the summer months with play throughout the South Bay Area. First and second round champions included:

Ed Powell and Tom Fujimoto, Ted Fujimoto and Dan Casson in the Monday Alondra league;

Dick Coffey and Jim Donahue, Dan Afee and Bob Sheetz in the Monday Western league;

Mike Turney and Dave Conklin in the Monday/Tuesday Los Verdes league;

Major Roy Clark and Captain Bill Houchin, Tom Coates and Fred Benson in the Tuesday Alondra league;

Jim Bearns and Phil Davis, Art Richards and Joe Jarczewski in the Tuesday Fox Hills league;

Tom Gentle and Bill Rogers, John MacDonald and Vern de Camp in the Tuesday Alondra league;

Bill Tanner and John Jennette, Wayne Mathis and Roy Raymer in the Tuesday Alondra league;

Roy Bucher and Woody Fletcher, Frank Sullivan and Larry Smith in the Wednesday Alondra league;

Joe Castricone and Don Riddle, Mike Thayer and Howard Miller in the Wednesday Alondra league;

Neal Ebright and Bob Blaheney, Fran Connors and Warren Klauer in another Wednesday Alondra league;

Ed Geyer and Cliff Ross, Dick Outcault and Rollie Pierce in the Wednesday Western league;

Bert Swearinger and Mike Turney, Virg Wilson and Ed Klein in the Thursday Alondra league;

Bill Shireff and Mac Peckham, Jim Lasley and Moss Goya in a Thursday Western league;

Ken Turner and Harvey Cook, Ted Dezuine and Ed Kong in a Thursday Alondra league;

Bill Weir and Ned Garlock, Frank Adams and Ned Garlock in a Friday Western league;

Hugh Wilson and Ulf Brynjestad in Monday; Tony Piccirello



PICK-UP FOR GYRO PICK-OFF—Patent for new electromagnetic transducer, used as gyroscope pick-off device, has been awarded to Northrop Corporation's Henry Packard. Device increases gyro's accuracy and ability to sense motion. Typical gyro on which device can be used is held by inventor, while Lester R. Grohe, manager of Precision Products department, Norwood, Massachusetts, points to pick-off position. Looking on are Northrop's director of Patents, Willard Graham (left), and Ernest Johnson, PPD director of Engineering. Patent carried \$100 award, presented by Graham at patent symposium for 150 company employees.

and Chuck Chamberlin, Oscar Sanchez and Marty Engle in Wednesday; L. Peterson and Dick Domici, Bob Lieber and Max Pellerin in Wednesday short course leagues.

## Freedoms

(Continued from page 1)

Mount Vernon, Virginia, Valley Forge, the Washington Crossing Park and Independence Hall in Philadelphia.

"It was all so wonderful and exciting," Joyce said. "It was my first trip out of California and a chance to see all of the places I have read about."

Joyce, incidentally, aspires to a career as an airline stewardess. She is one of nine children, including six who are now at home. Five of the six attend the same school with her.

### Exceptional Youngster

Wynne Silver, principal at Joyce's school, describes her as an exceptional youngster with a rare blend of talents — studious, but deeply concerned with extra-curricular activities; modest, but popular; and well aware of all that is going on around her.

"Joyce has appeared before adults and students to report on her trip," Mr. Silver said, "and on each occasion has impressed everyone with her sincerity and her many talents."

## 25-Year Club

(Continued from page 1)

is an important part."

Touching on a Northrop philosophy that is emphasized at Nortronics, Mr. Stevens said each successful venture and product is directly attributable to achievement through the efforts of people.

"Northrop is a good place to work, not only for the man on the floor, but for everybody—the supervisor, the president, the clerk, you, me, all of us," Mr. Stevens said. "As long as we work together, accept challenges, create opportunities, we will grow in stability and improve our position in a demanding business environment."

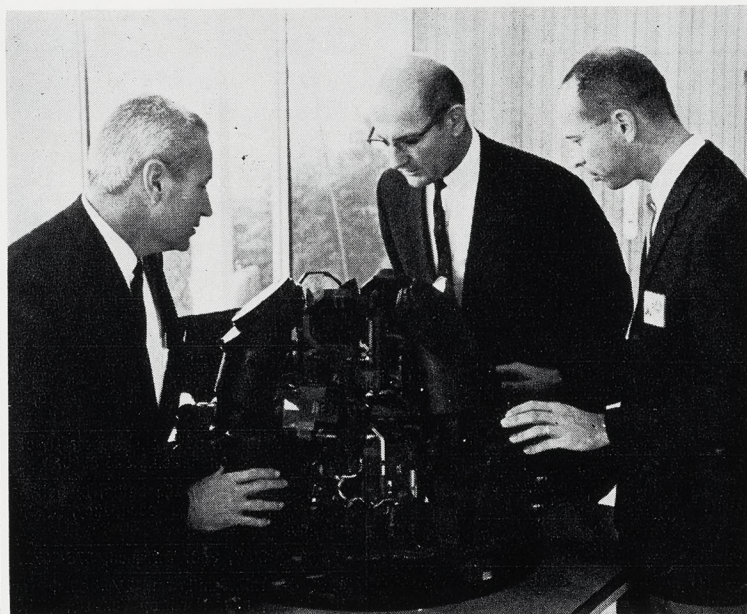
Bill Burch, chief of Employee Relations, delivered the keynote address.

Four 25-year men took the lead in planning the initial dinner and will serve as a steering committee to plan other events and special activities. They are John Baker, Grant Gunderson, Bill Nelson and Al Vogel.

Other Nortronics employees who became charter members of the new club are Hugh Zebarth, John Privett, Willard Gramm, Niels Bertelsen, Herman Crawford, Frieda Mooring, Otho Hudson, Oscar Gumpert, Chester Druliner jr., Richard Clarke, William Beyer, John Cummins, Maxwell Warren and Earl Tripp.



LET'S GET IT JUST A BIT HIGHER—Bob Peck (left), Nortronics artist, assists C. R. Jewett, Nortronics maintenance man, in positioning one of a series of paintings on display at Palos Verdes. Original art works, all done by Nortronics painters, have been popular with employees and visitors.



HISTORY ON DISPLAY—Northrop-developed, and the nation's first, stellar-monitored inertial guidance system has proven to be a popular display in lobby at Nortronics Palos Verdes. Three men who developed system (from left) R. H. Lane, J. H. Gisbrecht and R. C. Corson, discuss its features. Bulky, by today's standards, system served aboard Northrop's SNARK missile, kept it correctly oriented in space over a 5000-mile range.



# NORTHROP NEWS

NORTHROP NORTRONICS

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## "Teams" System Completes Test Series Successfully

Northrop Nortronics' initial TEAMS system has successfully completed an intensive Reliability test program which began last July at the Norair Environmental Laboratory.

The same TEAMS initial unit has entered its final test phase, a full-scale Environmental Qualification Test Program.

TEAMS (Test Evaluation and Monitoring System) will serve aboard a new class of Navy destroyer escort as the Navy's fastest troubleshooter — an automatic checkout system designed to keep tabs on as many as 10 major on-board electronic systems. Initial units, however, will monitor only four crucial electronic systems, sonar gear, fire control radar and two search radars.

Specifications required a minimum of 600 test hours. Under the test hours one accountable failure would have jumped the requirement to 880 hours and two or more to 1080 hours.

The TEAMS unit accomplished the test program with customer acceptance, at the minimum of 600 hours of accumulated test time when no accountable failure occurred in the TEAMS system.

### On Vibration Fixture

During this reliability test period, TEAMS was mounted on a vibration fixture within a special chamber where temperatures and humidity were rigidly controlled. The unit was put through a wide range of tests while the temperature was maintained at a constant 122°F., voltage inputs were altered, and vibration applied periodically.

At the onset of the program a special TEAMS reliability test failure classification committee was formed.

Included as members were Herb Mayers of the Defense Contract Administration Services office at Nortronics; Bill Clewett of Test Requirements; Don Hilyard of Test Operations; Ted Taylor of Reliability and Jay Flynt of the TEAMS Project group.

It was the duty of this committee to monitor the entire test program, to determine classification of any failures and to institute action as required.

### 600 Hour Requirement

It was this committee that signed off the unit after the minimum 600-hour requirement successfully was met.

The Qualification test program will run for approximately 10 weeks. TEAMS will be located eight of those weeks at Northrop Norair, followed by two weeks in a special inclination and shock test facility at Hughes Aircraft.

Qualification tests will include additional vibration checks, tests at high (plus 75° F.) and low (minus 62° F.) temperatures, tests during humidity (95% of relative humidity) extremes, mechanical noise, electromagnetic interference, water sprays and while cyclically inclined at a 45° angle to simulate ship's roll. There will also be shock tests where up to 150 G's of shock will be applied.

"The unqualified success of the Reliability phase of this over-all test program is extremely gratifying," Program Manager Bill Van Ordstrand said. "We feel the Qualification tests will be an equal success and that the Navy will be receiving an extremely durable and dependable system, one that will do the job under any operational environment."

## Nortronics Now Has Three JA Advisory Groups

Three Junior Achievement firms, one more than last year, are being counseled by Northrop Nortronics volunteers this year.

These volunteers are called advisors. They devote several hours of their time each week to assist enterprising high school students, both boys and girls, who "learn-by-doing" the challenges and rewards of the American free enterprise system.

Each JA firm organizes, elects its own officers, sells stock for operating capital, selects, manufactures and markets a product. Salaries are paid those who work in the firms and stock is liquidated, often with dividends, at the conclusion of each business year.

Last year a JA firm counseled by Nortronics Anaheim men was judged best in the entire Southern California area and fourth among 900 JA firms in the Western United States.

This year two firms are being counseled by Anaheim personnel, one by Hawthorne-Palos Verdes personnel, from Nortronics.

### Names Of Advisors

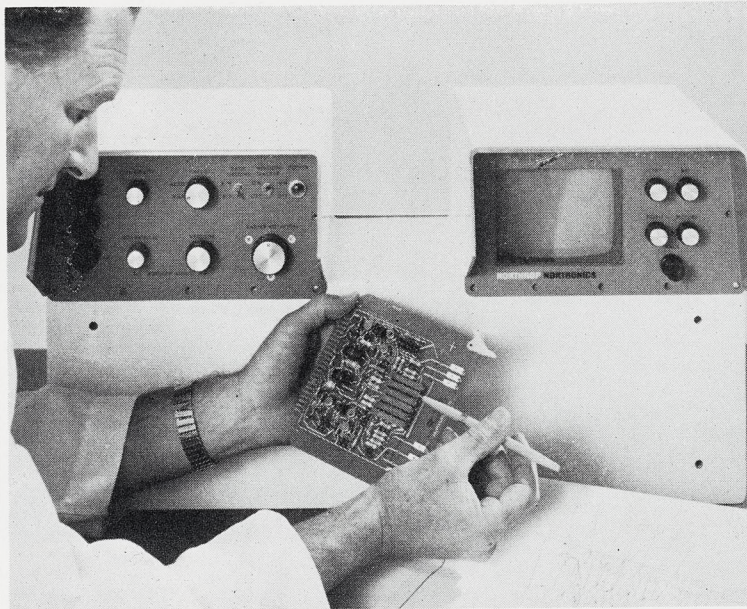
R. E. Varner (management), R. W. McCarl (production), J. R. Murphy (sales) and R. M. Detmers (alternate) of Anaheim are counseling a firm called NAJAC.

It has selected an epoxy candle holder as its product.

NAJAC officers are John Brown, president; Patti Pederson, treasurer; Patti Ropeter, corporate secretary; Dave Coderman, vice president—sales; and Tom Geiser, vice president — manufacturing. Young Brown was president of the highly-successful Anaheim-counseled firm last year and the other officers were active firm participants.

J. W. Gillings (management).

(See JA, page 6)



SYSTEMS CHECKOUT of the Tracking Error Detector (TED) is performed by Al Dudacek of Nortronics Palos Verdes, who checks a printed circuit board against its wiring diagram. In the background are the TED operator's console and the television screen which will allow the operator to see exactly what the cameras are photographing.

## Automated Accounting System Keeps Unique Tab On Costs

Northrop Nortronics took another step forward last month in its development of an automated accounting system which utilizes high-speed computers to calculate and record financial information.

This latest step incorporates into the system the preparation of Nortronics' General Ledger, which receives input from other automated reports and ledgers and summarizes the data to show Nortronics' financial condition: assets, liabilities, reserves, and investment.

Nortronics now utilizes automated accounting for every step in the reporting of cost data through the summarization of such data into the General Ledger.

Accurate, speedy and readily adaptable to diversified operations, the system is serving Nortronics in carrying out one of the most diversified work loads in its history.

### Sound Control Essential

"Sound financial control is essential for success when you serve many customers under a variety of contract forms," said Don Lewis, Nortronics treasurer. "Therefore it is extremely important for us to know exactly what costs are being applied to each project and those which are expected to be applied to the project in the future."

The automated accounting system is a large step toward filling this role in providing up-to-the-minute information on every in-house project, not at the conclusion of the contract but on a continuing basis.

The basis element in the system is the Weekly Cost Report. It provides essential information on labor, material, general and administrative costs and material commitments for each in-house project.

From weekly Cost Reports and monthly Cost Ledgers, the Sales and Income Analyses are issued. They automatically calculate the sales, costs, work in progress, in-

come and profits on each project on a report prepared only five days after the month-end.

"This combination of data, available in a timely fashion, allows us to view each project individually and also in summary as a contribution to the entire operation of the division," Mr. Lewis said.

### Flexibility & Accuracy

Bob Norton, director of Accounting, points out that key aspects of the system are flexibility and accuracy.

Calculations are now made by the computer that once required hours by manual methods. He added that accountants, released from calculating and recording chores, can utilize their time more effectively in analysis and other tasks.

Three major Northrop organizations have played important roles in the implementation of the automated financial reporting system.

Mr. Norton and key members of his staff have coordinated accounting contributions. Harry Ewing, project coordinator, has handled Management Systems efforts.

Transferring basic information into computer and data processing language has been performed primarily by Russ Mast, Don Sevey and their staff in Northrop Data Processing.

Mr. Shave, chief of Management Systems, states that similar automated methods applied to the forecasting of future costs is the next step in the plan to improve the financial control system.

## Ventura Named Finalist In Anti-Sub Competition

Northrop Ventura has been selected as a finalist in the recently concluded competition to select a contractor for development and manufacture of an anti-submarine warfare target for the U.S. Navy, it was announced November 3.

## TED Makes Vandenberg AFB Bow

TED has arrived at Vandenberg Air Force Base, courtesy of Nortronics Palos Verdes.

TED—for Tracking Error Detector—is an automatic tracking system for improving photographic coverage of missile launches.

The first of six TED units ordered for use at Vandenberg arrived there 10 days ago, and the others are scheduled to follow at 20-day intervals.

### Only 120 Days

Leading the TED effort at Palos Verdes was Project Engineer Jaime Oaxaca, who credited production personnel with delivering the first unit in only 120 days.

"They didn't have much time," Mr. Oaxaca said, "and they really came up with results."

The project engineer singled out Bob Sadil of Manufacturing Control and Ross Rogers of Engineering Development Support as being especially active in the production of the TED units.

The system uses television to locate and follow the missile upon launching, resulting in far steadier pictures than could be obtained by manually operated photo camera tracking mounts.

### Eliminates Loss of Sight

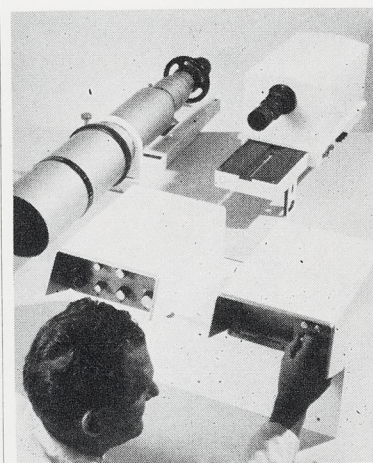
"Human reaction time and the narrow field of view of large telephoto lenses has often caused a momentary loss of the subject from the screen," a Nortronics official said.

"The problem is similar to trying to keep high-powered binoculars centered in on a fast-moving play in a football game."

To eliminate losing sight of the missile, the TED television camera allows its operator to lock on to the image electronically.

The camera then follows the flight automatically. Additional circuitry enables the camera to continue tracking the missile even if it is momentarily lost behind clouds.

(See TED, page 6)



A TELEVISION SCREEN and a high-powered lens are part of the Tracking Error Detector (TED) system built by Nortronics Palos Verdes to improve quality of photographs taken of missile launches. Through the use of the lens, vidicon camera (at right) and electronic circuitry, the TED is always automatically "on target" and steady.



# How Company Scientists Contributed To Metals Bonding Advance Bringing SST Closer To Production

Each advance in aerospace technology is marked by a point in time when basic research gives way to applied research and development, when ideas are transposed into hardware.

In the evolution of concepts, techniques and processes, this period is a crucial one, touching each product line and directly affecting new business. It can be a stumbling block or a catapult.

Northrop Corporation concentrates many of its resources to bridge this gap—the wide chasm between the possible and the practical.

## Approaches 10 Years

Engineers, scientists and technicians, research specialists, test personnel and planners, tooling and equipment experts, machinists and assemblers, administrators, buyers and schedulers, have a part in the over-all effort.

To say one group, individual or function is more important than another is presumptive. But some functions, by the very nature of their problems, perform more extensively in this field than others. It may be Process Control, Materials Research, Engineering Research Laboratories or Manufacturing Research and Development, to name a few.

The latter group at Northrop Norair, now approaching its 10th anniversary of service, is typical of all. It contains less than 40 employees, but has made a marked impact on Northrop's reputation as a leader in the advancement of aerospace production technology.

Over the past 10 years this group has taken an active role in advancing techniques in defusion bonding of metals of all types; in production welding, plastics, in electronic machine and process control and electrical radiant heat work, in metal forming, shaping and cutting, and in a wide variety of processes and procedures.

Of particular interest are contributions helping Northrop reach



EMPHASIS ON PEOPLE—Talented individuals, like those above, are given primary credit for successful Manufacturing Research and Development effort at Norair. Men have broad knowledge of many fields, yet specialize in

one or more. They keep up with the many developments in this field. Most are Northrop veterans. Group above has served Northrop a total of 350 years. They are part of the many Northrop people contributing to progress.

a position of prominence in the field of forming, welding, machining and bonding of various metals—titanium in particular. Aluminum, alloys of many types, magnesium, columbium, molybdenum and tantalum and various forms of stainless steel have also been the objectives of extensive work on USAF contracts.

## Successful Bonding

The first known successful bonding of thin titanium with honeycomb sandwich material was accomplished by this group to build solar panels for the Surveyor moon-probing satellites.

The Nortobraze radiant brazing system which opened the doors to the use of high-intensity quartz lamps for brazing of aerospace metals attained a great deal of its emphasis within Manufacturing R&D at Norair. This technique promises outstanding results with the coming of supersonic transport program. Nortobraze licensees are producing equipment for/or in the U.S., Canada, England and Spain.

A titanium producibility program at Northrop also commands a great deal of time within Manufacturing R&D.

Despite its accomplishments in helping establish and develop new techniques and processes, Norair's Manufacturing R&D organization is primarily concerned with the practical application of new equipment and methods developments and their relationship to production, today and tomorrow.

"The solution of production problems today is always of primary concern to us," says Barney Gaiennie, chief of Manufacturing R&D. "However, we are constantly looking ahead to new possibilities, new concepts and new ideas for us tomorrow."

Because Northrop has pioneered in developing certain new ideas and new techniques in aerospace work, Norair's Manufacturing R&D organization finds itself in a unique position—it handles internal problems when required on a routine basis. But is also an income producing element.

Income is derived and work done in the Norair areas of interest from the performance of applied research and development for outside interests, governmental and private, and from the li-

censing of certain rights to data related to Norair developments.

## From Use Of Data

"We are working with Product Licensing toward an annual goal of \$100,000 derived solely from the use of data," Mr. Gaiennie said. "This income will come in without the capital outlays normally associated with equipment, facilities and personnel. It will come strictly from knowledge."



Mr. Gaiennie

Although Manufacturing R&D operates a modest workshop where experimental and developmental work is carried out, along with small-lot production and first product fabrication, it relies heavily upon the talents of an unusual group of individuals for the majority of its successes.

These are the 14 senior research engineers, three research engineers and a group of supporting personnel that are the experienced core of the organization.

(See R&D, page 5)

## Research Agreement Made With Schools

Northrop Corporation has entered into a research agreement with five universities by joining the schools' Industrial Associates Programs.

The universities and programs are:

Massachusetts Institute of Technology Industrial Liaison Program; Case Institute of Technology Associates Program; California Institute of Technology Industrial Associates Program.

Princeton University Corporate Associates Program in Aeronautical Engineering; and Stanford University Industrial Affiliates Program in Aeronautics and Astronautics.

The programs are administered through the corporation's University Relations Advisory Board.

## November 26 Slated As NRC Dance Date

Northrop Recreation Clubs are going all out in planning the big all-Northrop Holiday Dance set this year for November 26 at the famed International Hotel.

For instance, three major facilities, the International Ballroom, the Rose Room and the Blue Room, have been reserved exclusively for the use of Northrop folk.

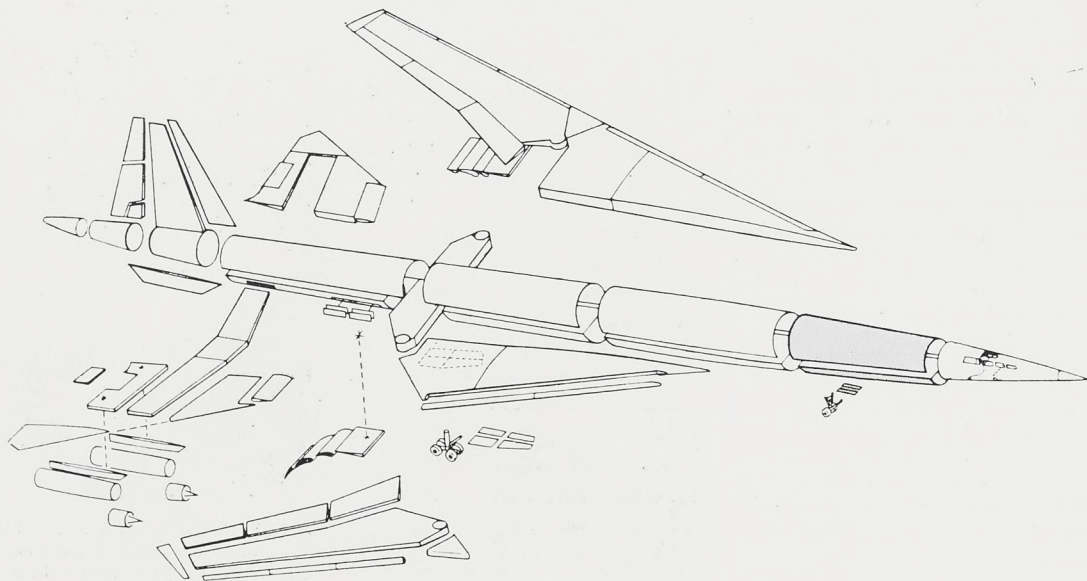
Alvino Rey and his Orchestra, the Latinaires and the Guideposts will provide music in the three facilities respectively, giving dancers an opportunity to choose their entertainment.

The cost is a low \$2 per person. Tickets are now available at all Northrop ticket outlets. Validated parking will be available for either \$1 or 50 cents.

## NRC Gets Pool Table

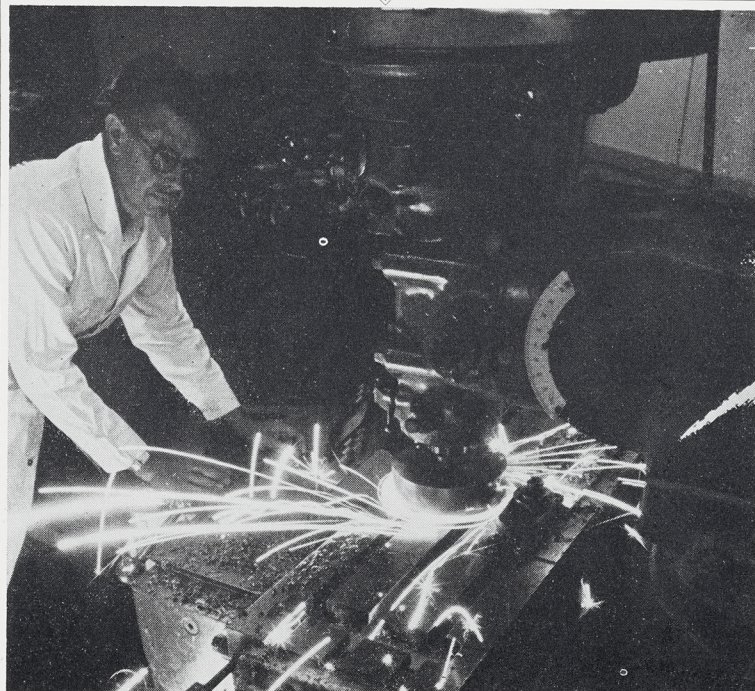
A regulation billiard table is the latest piece of equipment added to the NRC Clubhouse, Hawthorne. Located in the old executive dining room, the table is available for lunchtime and afternoon play without charge.

## SST ANATOMY



Shaded area of sleek jet airliner which The Boeing Company has entered in supersonic transport competition is portion for which Northrop may contribute. Under Boeing's "total program" plan, Northrop Norair and five other

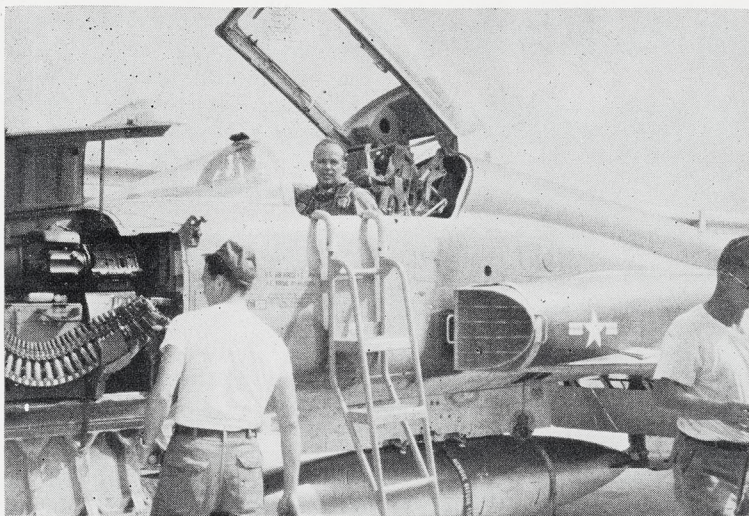
aerospace firms will be assured the opportunity of a continuing part on the SST and will share in \$1.5 billion in subcontract work. The technique of titanium brazing (see story) helps make SST possible.



TOWARD TITANIUM TECHNOLOGY—Fred Yunt, research assistant, uses rotary insert cutter he developed to machine titanium alloy. Tiny particles are ignited by air, trace fiery patterns. Work is typical of Norair Manufacturing R&D efforts to advance technologies, devise new methods and improve production techniques for today's and tomorrow's products.



## ORIGINAL SKOSHI TIGER PLANE



COMBAT VETERAN of over 270 missions is Captain Robert E. Kennedy shown returning from last mission on recent tour of duty. The airplane, a Northrop F-5, was one of the original Skoshi Tiger aircraft. Captain Kennedy had high praise for F-5 performance.

## AF Captain Has High Praise For Our Product

Captain Robert E. Kennedy, who has logged 270 combat missions in many FAC-type aircraft while in Vietnam has particular praise for the F-5.

According to Donald M. Kindy, Northrop technical representative, Captain Kennedy particularly emphasized the ease of taxiing on the ground and the outstanding maneuverability of the F-5 once airborne.

His last mission on his present tour of duty was in an F-5, an airplane that was one of the original Skoshi Tiger aircraft. He pointed to the cat-like quick response of the F-5 as one which made the aircraft particularly advantageous to pilots.

## Corporate-Wide Facilities Meeting Held at Norair Oct. 25-26

A corporate-wide facilities conference was held during October 25-26 at Norair. Purpose of the conference was to enable facilities executives to exchange views and study methods of modernizing and expanding equipment and facilities.

Keynoting this theme, R. R. Nolan, senior corporate vice president in charge of Manufacturing and Administration, pointed up ideas on successfully achieving these objectives. The conference was directed by Jack Hinchliffe, corporate director of Facilities who chaired the two-day session.

Among the 27 Facilities personnel who attended were: Ralph Carlson, Northrop Carolina; Dick Shaughnessy, Needham; Larry Freeman, PPD; Gerry DuKet, Nortronics Palos Verdes; Jim Adams, Haw-

thorne; Joe Rafter, Anaheim; Alex Cairns, NARD; Mike Nolan, Corporate Data Processing; Willard Lindstrand, Dick Dahman, Harold Ritter, Jack Conroy, Milt Uhler, Vint Higbie, Ernie Rogers, Jim Hauser, Paul Spikula, Fred Kratz, all of Norair; Walter N. Mann and John Evans, Ventura; George Dunbar, Dayton, Norair and Messrs. Nolan and Hinchliffe.

## You May Be Hawaii Trip Winner!

A Christmas holiday in Hawaii for free?

Could be, if by December 7 you've signed up for the year-end trek and paid your fees. That's when one name, from all signed up, will be drawn at random for a free trip.

Departure date is December 24 and return date, January 2. In between will be visits to Hilo, Kona, Maui and Oahu. The cost is \$358 for adults, \$258 for youngsters under 12 years.

Information is available through Personnel Activities offices.

## F-5'S ESCORT PRESIDENT



ESCORT OF F-5 fighters flew close to wingtip of President Johnson's airplane during its flight to Thailand. This photo, courtesy UPI, transmitted by radio from Thailand appeared in papers all over nation.

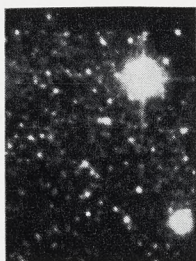
## KOREAN PRECISION FLYERS



PICTURE BOOK PRECISION—The Black Knights, Republic of Korea Air Force aerobatic and precision flying team, flash by in their Northrop F-5's in close formation. Note distinctive ROKAF markings and faint vapor trails at wingtips. Black Knights were a hit at recent Korean Armed Forces Day observance, later flew special demonstration for USAF Chief of Staff, General John B. McConnell.

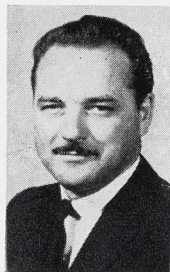
## AD ASTRA PER ASPERA

## Dr. Fallis In Lecture Series On Lifting Body Research



Dr. William B. Fallis, project chief of Northrop Norair's Lifting Entry Systems group will discuss research in that field Wednesday, November 16, at Northrop Institute of Technology in Inglewood.

The lecture is one of a series of faculty sponsored meetings. It will begin at 4 p.m. in the Student Lounge, preceded by a 3:30 p.m. coffee hour. The campus is at 750 Isis Street.



Dr. Fallis

Dr. Fallis has been involved in Lifting Entry research at Norair since the National Aeronautics and Space Administration began sponsoring the program in 1964.

Before joining Northrop, Dr. Fallis was a professor and chairman of the Mechanical Engineering department at the University of Waterloo in Kitchener, Ontario. He also has taught at Southern Methodist University and Texas Christian University.

The meeting is open to the public.

### Travel To Paris

Northrop scientists have traveled as far as Paris, France, in recent weeks, presenting technical papers on subjects as diverse as "Reconsidering Systems Analysis of Theater Air" and "Numerical Solution for Transient Scattering from a Hard Surface of Arbitrary Shape."

Charles H. Bernstein, director of Norair's Systems Evaluation section, was in Paris Sep-

tember 20 through 22, discussing his "Theater Air" topic at a NATO Symposium on Defense Resource Allocation.

Dr. K. M. Mitzner of Norair Electronic Systems Research gave an oral presentation, illustrated with slides, of his "Transient Scattering from a Hard Surface" topic on Saturday in Los Angeles.

He addressed a convention of the Acoustical Society of America, on the final day of a four-day meeting.

On Tuesday, Paul H. Von Essen, manager of Norair Technical Operations, spoke before the Society of American Value Engineers, meeting in Los Angeles. The panel discussion in which he participated was titled:

"Unique Approaches to Integrating Value Engineering into the Management-Operation Cycle."

### Attend Orientation

Forty employees from Northrop Nortronics have attended the initial orientation sessions of a planned program to introduce new computer users to Northrop Data Processing services and practices.

The meetings were held at NDP's Computing Center in Hawthorne. NDP supervisors conducted both sessions.

Among the subjects discussed in the three-hour sessions were data transmission, operating system, job processing, use of forms, library services, sources of technical information, and the 360/65 computer complex.

## Time To Make Your Holiday Plans Here

A regular holiday, a floating holiday and a normal weekend combine later this month to give Northrop Corporation on the West Coast a four-day holiday, the first of the year.

Thanksgiving Day, November 24, is a regular holiday. One of Northrop's two floating holidays will be observed Friday, November 25. Regular work shifts will resume Monday, November 28.

## Named Man of Month

Technical Sergeant George W. Hall was named maintenance man-of-the-month for the Northrop F-5-equipped 10th Fighter Commando Squadron in Vietnam during September.

Sergeant Hall kept his F-5 in commission, the highest rate of all aircraft in the unit, never missed a sortie and was credited with additional sorties diverted from other aircraft.

A Savings Bond registered in co-owner form becomes the sole and absolute property of the surviving co-owner in the event of the death of the other.

## On the Scene F-5 Evaluation



CONFERRING WITH AF officers on F-5 performance Northrop representatives on the scene at Bien Hoa Air Force Base in Vietnam get firsthand information. (L. to R.) Lt. Col. Robert F. Titus, commander, 10th Fighter Commando Squadron; Art DeBolt, manager, Pacific area, Northrop; Frank Perego, Norair vice president and manager, Marketing, and Colonel Wiltz P. Segura, vice commander, 3d Tactical Fighter Wing.



## Nell Langston One Of Four Huntsville Girls In Fashion Show



BRIGHT COLORS were a feature at a travel fashion show at which Nell Langston, a NSL Huntsville department receptionist, modeled this blouse and capri pants ensemble. She was one of four Huntsville secretaries featured at the fashion show.

Nell Langston, a receptionist at Northrop Space Laboratories' Huntsville department, was one of four Huntsville women featured recently in a vacation fashion show.

Mrs. Langston modeled brightly colored capri pants and a fiesta-styled multi-colored silk blouse at the luncheon, held in Huntsville's Sheraton Motor Inn.

The show was presented by Delta Airlines. All the models were secretaries from aerospace firms in the Huntsville area.

## Basketeers Ready To Start Tossing

Hook shots . . . jump shots . . . free throws.

It's basketball season again and NRC has reserved two local gyms for practice sessions, Lawndale high school on Saturdays (9 a.m. to 1 p.m.) and Leuzinger's girls' gym Mondays and Thursdays (6 to 10 p.m.) for teams and individual practice.

Regular NRC competition begins shortly after the first of the year. Application forms for individuals and teams are now available through Personnel Activities.

## QST All Hams, Big QSO Nov. 15

Amateur radio enthusiasts among Hawthorne area facilities are being invited to a special organizational meeting set for 5 p.m. November 15 at NRC Clubhouse, Hawthorne.

Bill Anderson is guiding a group interested in forming an NRC-sponsored radio club. He may be reached at ext. 1933, Norair, for details.

# Information-Protocol Center Helps Put Northrop's Best Foot Forward

Could you, the caller asked, tell me the name of the president of a major European industrial firm and if he is married, his wife's name?

An unusual request?

Not if you happen to be Curt L. Burdett of Northrop Norair's Customer Relations department.

Curt Burdett operates a customer Information and Protocol Center. He answers questions like this each day from information on hand or sources available to him.

Visit Burdett's office and you are immediately reminded of the office of an editor of a country weekly—a hodge-podge of books, files, cards, directories, reference material and general information.

But don't let the look fool you.

Curt knows exactly where everything is and can answer most queries in the time span of a telephone call.

## Six Years of Data

Burdett has been compiling his data for the past six years and adds a little more each day.

Much of the information concerns people. Names, locations, ranks, titles, affiliations, biographies and background data is available in depth. It covers military and governmental leaders, men of science and industry from nations around the world.

Northrop Corporation personnel conducting business on a world-wide basis find the center extremely helpful.

For this reason Customer Relations makes Curt Burdett's services available to all Northrop personnel.

Protocol information available at the center is another service.

Northrop representatives planning visits to other nations often check with Curt Burdett before they leave. They find out the correct etiquette to follow, how to address leaders, how to recognize military rank and what not to do while visiting some countries.

## How To Talk To Royalty

For instance, four Norair hourly-rated employees were selected to represent Northrop, along with key leaders, at turnover ceremonies for the F-5 in Norway. Their visit included state dinners and the occasion to meet and talk with royalty.

"We discussed customs and protocol at length and the men took the time to learn everything they could about Norway, its leaders and ceremonies," Burdett said. "They were a success."

Religious customs are also important to world travelers and Curt Burdett has accumulated much data in this field.

For instance, how Muslim followers observe Thursday and Friday as their "weekend," put significance on dietary restrictions, and even observe once each year a month-long period in which food is not taken during daylight hours. It is important travelers know and respect these customs.

## Observe Holidays

Other nations observe religious holidays and customs the traveler should be acquainted with.

It would require too much space to list the many volumes of reference material Curt Burdett maintains. But he is sure he can find the answer to almost any question in due time.

One unusual feature of his



ANSWERS UNLIMITED—C. L. (Curt) Burdett and Linda Cott turn to one of the many volumes in their customer Information and Protocol Center to answer a query. Customer Relations function at Norair provides data of many types to world-traveling Northrop personnel, including names, places, correct protocol and other little-known facts.

service is flags. He has miniature flags of just about every nation. And he has information on ranks and insignia of most military organizations around the world. He also maintains extensive listings of military abbreviations that often require interpretation for the un-informed or even the informed.

Curt Burdett is well-equipped for his job, both in what he has at hand and in background. He was in the Air Force for 20 years, including 17½ years as a master sergeant. He has served in the nation's protocol center, Washington, D.C., for more than eight years among other important points.

He may be reached at ext. 1366 at Norair.

## Mineral Hunter Greenwood Wins L.A. Fair Blue Ribbon

A case of cabochons (made from petrified wood, agate types and obsidian) won a blue ribbon and a trophy at the Los Angeles County Fair for Bill Greenwood, Mineral hunter Greenwood (Research Laboratories Instrumentation group) made a family project of entry with wife, Elinor, and children Helen, Monty and Danny, working to collect the materials during trips taken with the Gem and Mineral Club. Wife Elinor is Club secretary. The entry was given a high rating of 91 points by Fair officials.

## Officials Take Time Out To Help Boy Scouts

R. J. (Ross) Miller, Nortronics vice president — Technical, and four other executives took time out from busy schedules recently to sponsor Boy Scout honorees.

The honorees, Scouts who have attained the Eagle rank during the past year, were feted at a Recognition Dinner held October 13 at the Hollywood Palladium. Each honoree was sponsored by a business executive.

Joining Mr. Miller for this annual affair were Nortronics' G. C. Chalmers, Lloyd Balsam, Mike Turney and Hal Janssen.

Interest received on United States Savings Bonds is not subject to state or local income taxes.

## Indoor Flyers Hold Nov. 17 Meet at Leuzinger High

Norair's model plane enthusiasts are holding their third annual indoor flying meeting at Leuzinger High School, girls' gym on Thursday, November 17 from 7 p.m. to 10 p.m.

Every employee is not only invited to attend, but the club will supply the planes with trophies to the winner.

At the same meet, a trophy will be awarded to the best appearing radio-controlled semi-scale model as well as awards to best-styled gas or rubber-powered semi-scale model plane.

## Darnell Speaks to Pilot Trainees

Dan Darnell, manager of Customer Relations at Northrop Norair, was guest speaker at the October 21 dining-in honoring graduate pilots at Webb Air Force Base, Texas.

The pilots, members of Pilot Training Class 67-C, have logged many of their student hours in Northrop-built T-38 trainers.

Mr. Darnell is a former Air Force and aerospace industry engineering test pilot.

## Campers To Hike in Mexico Over Thanksgiving Holiday

Ensenada, Baja California, is the key objective of the Northrop Wanderers Camping Club as they gear for their Thanksgiving Holiday hike from November 23 to 27. The campout is planned for the Granada Cove Trailer Park.

Reservations must be made in advance and will be accepted through November 22. If you wish to go, contact Personnel Activities for reservations and maps of the area.

Part of the trip will be devoted to taking collected clothing and canned foods to Ensenada area orphanages. Those who wish to contribute can do so by depositing clothing in boxes at the NRC Clubhouse, Gate 16 or the Personnel Activities office, Plant One.

If unable to bring your contribution, contact Betty Jaeger, chairman, at 374-5879. She'll arrange to pick up your contribution.

## Skiers Launch Season On Thursday, Nov. 17

Skiers start gearing for their regular series of slides down the slopes when they hold their first meeting on Thursday, November 17, 8 p.m. at the NRC Clubhouse.

On the agenda is election of officers and to plan a schedule of biweekly trips to the Mammoth and June Mountain ski areas.

The meeting will feature a description of the advantages of the new Park City, Utah Ski area and a film on ski techniques.

According to Elvira Kuehneger, Norair, ext. 2711, and Klaus Biber, Nortronics, ext. 653, future plans include special ski trips, beginner's instructions and a dance to be held at year's end. If interested in skiing, call either Klaus or Elvira.

## Tennis Club Kickoff

A newly organized NRC table tennis activity for the Hawthorne area will kickoff at 7 p.m. November 10 at NRC Clubhouse. Those interested are invited to turn out and help plan future competitive events.

Savings Bonds purchased prior to December 1, 1965, when the current interest rate of 4.15 percent became effective, will earn an additional 4/10 of 1 percent from now on, which brings their rate of yield into line with current bonds.



Hey, wait a second—you guys just won this month's ZD Slogan contest!



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

# Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

**For Sale**

**Chevrolet**, 1957 4-dr. h/top, V-8 w/Power-glide trans., recent eng. o/haul, \$350. Hawthorne, 676-6423. A

**Volkswagen**, 1965 De Luxe, r/h, stereo, orig. owner, \$1375. West. Village, GR 9-6811. A

**Cadillac**, 1964 Coupe de Ville, all power, r/h, tilt wheel, new tires, low mileage, \$3300. Hermosa Bch., 372-6755. A

**House**, 3-bdrm., 1 1/4 bath, det. garage, spacious backyard, sprinklers, cpts., drapes, fireplace, \$24,950. Inglewood, 757-1224. A

**Volkswagen**, 1965 sedan, 9400 miles, steel sunroof, r/h, s/belts, \$1475. Torrance, 326-5731. A

**Drums**, \$150. Torrance, 329-2925. A

**Toy Chest**, upholstered, \$7.50. Box 2201. A

**Chair**, antique leather-covered oak, \$45. Playa del Rey, 823-4167. A

**Skis**, Kastle, 7'1" hickory w/Lock Nevada bindings, cable, \$40. Granada Hills, 362-2113. A

**Chevrolet**, 1957 Nomad, p/s, p/b & p/w, air cond., 283 cu. in. eng., \$950. Hawthorne, 679-8687. A

**Stereo**, Magnavox, 3-pc. component, \$100. Torrance, 328-3576. A

**Desk**, wood, \$50. Hawthorne, 676-1235. A

**Chevrolet**, 1965 Super Sport Malibu, warranty, 275 h.p., 327 eng., 10,000 miles, \$2450. Gardena, 329-9662. A

**Rambler**, 1964 Classic, 660, 2-dr., V-8, p/s, p/b, auto., r/h, 28,000 miles, \$1300. Hawthorne, OS 6-4231. A

**Mustang**, 1965 convt., 289 V-8 eng., \$2250. Rolling Hills, 547-2716. A

**Hall Tree**, antique, w/bench seat & other items, \$100. Gardena, 324-1566. A

**Judson Supercharger**, for VW, all parts & instructions, \$85. Lomita, 326-0940. A

**Clarinet**, Dumont w/case, \$65. Harbor City, 326-8033. A

**Rifle**, Marlin 39A 22, near new, \$50. Torrance, 326-6195. A

**Barracuda**, 1966, 235 auto., console, V-8 positrac., r/h, 8-track stereo, \$2600. Palmdale, 805-947-1867. A

**Guitar**, Rickenbacker, 12 string, fire-glow finish, never used, in case, cost \$350, \$250. La Habra, 691-5166. A

**Mercury**, 1951, good eng., \$100. L.A., PL 4-0078. A

**Precision Tools**, 26" Gerstner chest, suitable for inspector or jig builder, \$372. L.A., AN 9-0093. A

**House**, 1 1/2 miles to Northrop Ventura, 3-bdrm., custom features, dishwasher, garb. disp., fireplace, dps., cpts., landscaped, 10% down, \$22,000. Newbury Pk., 498-3043. A

**Ford**, 1965, 2-dr., V-8, r/h, 1 owner, \$2200. Hawthorne, 676-8724. A

**Camera**, 2 1/4"x3 1/4" Speed Graphic, equipped w/Kaylart range finder, Abbey flashgun, film pack adapter, 12 cut film holders, sunshade, filters & carrying case, \$50. Pac. Palisades, GL 4-7338. A

**Chevrolet**, 1963 Bel Air, 9-pass. station wagon, auto. trans., p/s, p/b, w/s/w, r/h, luggage rack, other extras, 38,000 miles, \$1750. Orange, 532-3743. A

**Reducing Machine**, deluxe Stauffer, \$95. Hawthorne, 675-6020. A

**Wheels**, 2 Crager "GT" mags., fit 14" Ford, Plymouth & Dodge, \$50. Inglewood, 671-2959. A

**Refrigerator**, Kelvinator, 11 cu. ft., crosstop 80 lb. freezer, \$60. Manhattan Bch., 545-3435. A

**Washer**, 1960 Frig. auto., \$20. Long Bch., 633-5938. A

**Mobile Home**, 1964 Biltmore, 10' x 40', birch paneling, lge. bathroom w/shower, Wedgewood range & oven bltin., General Electric refrig., furn., near Northrop, \$3000. Gardena, 327-2698. A

**Archery Bow**, 35 lb., w/cover & quiver, \$20. Hawthorne, OS 6-3886. A

**Honda**, 305, low mileage, \$395. Torrance, 371-7956. A

**Organ**, Hammond M-3 spinet w/percussion, unmarred maple finish, \$750. San Pedro, 831-5837. A

**Bedsprad**, quilted, gold, king size, \$20. Hawthorne, 676-2661. A

**Pontiac**, 1963 Tempest LeMans, r/h, s/belts, auto. trans., 326 eng., 2-dr., h/top, \$1450. Hawthorne, 675-1927. A

**Stove**, built-in-type, Pioneer oven w/bottom broiler, clock, 4-burner, \$50. Stanton, 527-5407. A

**Home**, 2-bdrm., on 2 1/2 acres, lawns & lots of trees, out bldgs., 24/180', \$13,000. Lancaster, WH 2-2388. A

**DeSoto**, 1956, 2-dr., h/top, auto. trans., p/s, p/b, \$275. Fullerton, LA 5-2516. A

**Snowsuits**, hand knit, sizes infant to 4 yrs., choice of color, wool, \$10; orlon sayelle, \$12. Hawthorne, 644-3235. A

**Boat**, small, 33 beam, 67 long, fiberglassed, \$15. Lawndale, 371-7311. A

**Aquarium**, 26 gal., w/variety of tropical fish, underground filter, artificial plants, fluorescent lights & stand, heaters, \$60. Hawthorne, 676-4536. A

**Travel Trunk**, \$10. P.V., 377-6435. A

**Jacke**, black broadtail, blk. dble. mink collar & cuffs, size 10, \$150. L.A., 762-9397. A

**Bicycle**, 20" Stelber, needs wheel repair, \$10. Torrance, 371-5916. A

**For Sale**

**Stereo**, AM/FM, Magnavox, maple cabinet, \$100. Inglewood, 675-6721. A

**Buick**, 1964 Wildcat, full power, new tires, 24,000 miles, \$2250. Torrance, DA 4-5422. A

**Surfboard**, 9'6", Bing, \$100. Hawthorne, DA 5-0543. A

**Ring**, 1/2 carat diamond, set in flower petal design, white gold, w/11 chips, artcarved, cost \$275, never worn, \$150. Torrance, 325-4737. A

**Austin Healey Sprite**, 1962, near new, good tires, \$675. L.A., PL 4-2784. A

**Sailboat**, Trimaran 17', \$180. Inglewood, 677-6348. A

**Range**, Sears Kenmore, 30", gas, 4 burners, griddle, clock & timer, glass dr. oven, broiler, rotisserie, 2 yrs. old, cost \$225; \$65. Torrance, 830-4265. A

**Buick**, 1962 Skylark convt., p/s, p/b, h/top, \$1095. Somis, 805-482-1186. A

**Honda**, Cycle, 250 Scrambler, low miles, \$595. Box 2202. A

**Crib**, w/Kantwet mattress, convt. high-chair, \$20. Manhattan Bch., FR 4-4780. A

**Coffee Table**, walnut, Danish modern, \$15. P.V. Pen., 377-9666. A

**Washer-Dryer**, Westinghouse elec., stack unit, aqua, \$150. Hawthorne, 377-0856. A

**Dishwasher**, General Electric convt. front load, can be bltin, still under guarantee, \$170. Yorba Linda, 714-528-9227. A

**Home**, 3-bdrm., den, step dn. family rm. w/fireplace, cust. paneling, 1 1/4 bath, serv. rm., 2-car gar., bltins, cpts., dps., on .3-acre yd., \$23,850. La Mirada, WH 4-1406. A

**Lot**, lge. level, Lunada Bay, underground utils., \$1000 or more dn., owner will carry bal. at 6.25%, \$22,750. Rolling Hills Ests., 377-0145. A

**Chevrolet**, 1958, 348 cu. in. eng. 409 car. clutch, Muncie 4-spd., Hurst 4.56 posi., hvy. duty springs & shocks, stereo & tapes, p/s, p/b, radio, many other extras, \$1400. Inglewood, 677-1495. A

**Stereo Hi-Fi Components**, AM/FM tuner, dual amplifiers, dual preamps, four speakers, dual cross-overs, stereo turntable, \$69. Box 2203. A

**Chests-of-Drawers**, 2 matching, each 30"x17" by 36" high, old English handles, walnut stained, \$8 ea. Torrance, FR 9-5690. A

**Triumph**, TR 2 1/2, completely rebilt, re-upholstered, \$595. P. V. Ests., 377-1860. A

**Thunderbird**, 1960, Lincoln engine, \$700. Redondo Bch., 375-6715. A

**Cadillac**, 1962 4-dr. sedan, full power, all new tires, \$1650. Palmdale, 805-947-1597. A

**Violin**, full size, case & music stand, \$30. Inglewood, PL 6-7681. A

**Mercedes Benz**, 1957, 190 SL roadster, in good mechanical cond., \$950. Lakewood, HA 9-7879. A

**Hedge Trimmer**, power driven, \$5. Culver City, VE 9-5438. A

**Cabover Camper**, 8' Parkway, lge. windows, \$800. Fullerton, 879-2857, LA 5-9633. A

**Motorcycle**, 1953 AJS 500 cc single, rebilt. eng., magneto, new paint, rigged for dirt, \$275. Torrance, 371-1993. A

**Pontiac**, 1963, G.P., f/pwr, fac. air, just over 30 M miles, \$1795. Hawthorne, 675-4752. A

**Stove**, elec., General Electric, \$20. Redondo Bch., FR 5-5760. A

**Refrigerator**, International Harvester, approx. 13 yrs., freezer across top, 6 cu. ft., \$50. Rolling Hills, 377-1094. A

**Bicycle**, Schwinn, 2-spd. Sting Ray w/over-drive, orig. price \$75, \$30. Rolling Hills Ests., 325-5875. A

**Motorcycle**, Cushman Eagle, almost new, \$148.50. L.A., PL 5-6198. A

**Scout**, 1961, 4 wheel drive, full top, \$1100. Los Alamitos, GE 1-0843. A

**Boat**, 15' Dorsett Calypso, new in Mar. '65, 75 h.p. Evinrude, complete o/haul Jan. 1965, tilt trailer, spare wheel & tire, Coast Guard inspected, worth \$1500., \$1200. Palmdale, 947-6917. A

**Volvo**, 1966, 122S, 4-spd., 6 mo. warranty expires 12-5-'66, 13,000 mi., r/h, \$2200. Hawthorne, 679-7662. A

**Pups**, toy poodle, AKC champ, stock, 10 wks. old Dec. 1, male & female, \$100 ea. Anaheim, 714-772-2399. A

**Tape Recorder**, Concertone Berlant professional stereo, rack mounted in cabinet, speeds 7 1/2, 15 i.p.s., takes 10 1/2" reels, \$210. Oxnard, 486-0873. A

**Guitar**, elec., fender Stratocaster w/tremolo, custom neck & case, \$135. Box 2204. A

**Drum Set**, new hi-hat & 3 new cymbals, \$55. Redondo Bch., 371-8907. A

**Corvette**, 1962, 327 eng., 340 h.p., 4-spd., positraction, removable h/top, \$2000. Hawthorne, 322-2544. A

**Kitchen Cabinets**, 42", upper & tiled lower, dble. sink, \$20. Inglewood, PL 4-5358. A

**El Camino**, 1959, stick shift, \$695. Hawthorne, OS 5-7938. A

**Dachshund**, rare long hair, miniature-standard, AKC, born July 4, 1966, 1 male, 2 females, \$75 ea. Palmdale, 805-947-8581. A

**Alpa 6c SLR** 35mm w/f1.8 auto lens, ER case, \$225. Sherman Oaks, ST 8-9709. A

**Honda 50**, 1965, low mileage, all std. equip. plus carrying rack, spark arrestor, knobby tire, spare tire, tool kit & lube gun, \$195. Rosemead, 288-0207. A

**For Sale**

**Mower**, Lawn Boy, rotary-type, 2 cy. eng. grass catcher incld., extra blade, \$35. Redondo Bch., FR 2-1375. A

**Steering Wheel**, Nardi, wood, for MGB, \$50. Hawthorne, 676-9993. A

**MGA**, 1960, roadster, radio, wire wheels, motor, trans. & carbs. o/haul, \$550. Torrance, 370-1838. A

**Breakfront**, mahogany Drexell, curved glass door, 3 dustproof drawers, 2 side drs., 18x44x70, \$120. L.A., 839-0183. A

**Wig**, ladies', brunette, fully styled, w/black patten leather zipper bag & insert, \$50. Torrance, 375-6467. A

**Tires**, 3 6.95x14, Firestone, driven 4000 miles, \$10 ea. Inglewood, 673-0703. A

**Wall Module**, 6 units, solid walnut, \$75. Oxnard Bch., 805-483-1876. A

**Surfboard**, Velzy-Hawaiian, 9'1", \$90. Camarillo, 482-4244. A

**Ford**, 1965 Galaxie, 26,500 miles, air cond., p/s, p/b, \$2250. Pac. Palisades, 454-5001. A

**T-Bird**, 1960 convt., orig. owner, 52,800 miles, 3-spd. stick shift, new tires, clutch & trans., \$900. Manhattan Bch., 379-3003. A

**Mustang**, 1965 fastback, 6-cyl., 15,000 miles, \$1600. Pac. Palisades, 454-2090. A

**Bicycle**, boy's 24", 3-spd., just o/hauled, \$20. Huntington Bch., 714-842-5681. A

**Wanted to Buy**

**Boat**, 12' or 14', aluminum, not too heavy, one that can be carried on top of car. Gardena, 327-8927. B

**Dog House**, large, any condition. Torrance, DA 4-8663. B

**Gun**, .25 or .32 caliber automatic, good condition. Rolling Hills, FR 7-3487. B

**Hardtop**, for 1958 Mercedes 190SL. Inglewood, 752-7995. B

**Old motorcycles**, 1949-1955 BMW h.d., Tri. & Vincents. Hawthorne, 672-1576. B

**For Trade**

**Boat**, 16' fiberglass Wizzard, 35 h.p. Evinrude, tow rope, trade for 16' travel trailer in good condition. Gardena, DA 4-7623. C

**Machinists Gages**, dial, telescope, hole & radius, trade for .22 cal. pistol/rifle or 20 ga. shotgun. Box 2205. C

**Rentals Offered**

**Vacation Cabins**, Lake Gregory & Crestline, \$25 w/ends; \$60 wk. Venice, EX 1-2040. E

**Apt**, 2-bdrm., sun rm., furn., gar., 5 min. from beach, 1 child OK, \$150 mo. Hermosa Bch., 372-5985. E

**House**, 2-bdrm. & convt. den, fenced yd., water & trash pd., near schools, Leimert Park area, \$125 mo. Playa del Rey, 823-1910. E

**Duplex**, 2-bdrm., unfurn., rear, h/wood floors, disp., gar., yard, 1 child OK, near schools & shopping, \$95. mo. L.A., 755-0435. E

**Apt**, 2-bdrm., unfurn., bltins, cpts., dps., forced air heat, 2 min. from Norair, adults only, \$120. Lawndale, OS 6-5425. E

**Apt**, 2-bdrm., 1 w/small fenced yd., cpts., dps., bltins, disp., closed gar., all elec., \$120-\$130. unfurn. Torrance, 375-2091, 375-9397. E

**Apt**, 1-bdrm., furn., disp., gar., \$87.50. Torrance, 373-1266. E

**Cabin**, Lake Arrowhead, secluded canyon, close to lake, fireplace, \$25 w/end, \$55 wk. N. Hollywood, 761-9645. E

**Apt**, 3-bdrm., furn., deluxe owner's lge. rms. & closets, 4 short blks. from Northrop, \$155 mo., incl. util. or will furn., TV set, elec. appliances & other items for \$175 mo. San Pedro, TE 3-2512. E

**House**, 1-bdrm., furn., fenced yard, 2 blocks south from Northrop, \$100 mo. Hawthorne, SP 2-2638. E

**Apts**, 1 & 2 bdrm., unfurn., pvt. deck, closed gar., bltins, cpts., dps., \$95 & \$125 mo. Torrance, FR 5-0867, 320-7547. E

**Home**, 3-bdrm., 2 bath, fam. rm., elec. bltins, dble. oven, fenced yd., landscaped, cpts., dps., fireplace, disp., 10 min. from Northrop Ventura, avail. Jan. 30, for lease, \$175-\$200 mo. Newbury Pk., 805-498-2235. E

**Cabin**, Big Bear Lake, sleeps 7 to 9, 18 w/end; \$50 wk. Bellflower, TO 7-0662. E

**House**, 2-bdrm., dble. gar., fenced yd., newly decorated, covered patio, near Lennox High, \$125 mo. Inglewood OR 2-5694. E

**Child Care Offered**

**Baby Sitting**, my home, fenced yard, near Northrop. Hawthorne, 679-3135. G

**Child Care Wanted**

**Desire** mature lady, w/own transportation for part-time evening child care. Redondo Bch., 379-1049. H

**Woman** to come to my home & care for 2 preschool children, ages 2 & 3. Hours from 7:30 a.m. to 4:30 p.m. Gardena, 324-2784. H

**Lost**

**Money Order** signed in the name of Robert W. Voeltz, in the area of plant 2 on October 29, contact Katherine Voeltz, ext. 4216, 2nd shift or Norair Lost & Found, ext. 1972. L

**Personals**

**House**, for sale, 3 baths, 3-bdrm., lge. rum-pus rm., 2400 sq. ft. on 1/2 acre lot, 4 yrs. old, in La Habra, low down payment if buyer qualifies. Contact Norair Credit Union, ext. 1117. L

**Personals**

**The family** of Clara Hall wishes to express their gratitude for all the beautiful flowers sent in memoriam of her. MARGARET OSBORNE. L

**Stake Truck**, 18', & driver avail. evenings & w/ends for household moving, reasonable. Redondo Bch., FR 8-2055. L

**The wife & family** of Charles B. Koeller wish to express our deep gratitude & sincere appreciation to our Northrop friends for the many cards, flowers, & other expressions of understanding & sympathy at the passing of our beloved husband & father. MRS. CHARLES B. KOELLER & FAMILY. L

**Pilots & students** wanted to fly new Cessna 150 Commuters for \$7 per hr. wet. 4-place aircraft to be added soon, 2 flight instructors avail. Torrance, OS 6-6138, DA 5-5288. L

**For Sale or Trade**

**Chevrolet**, 1938 panel truck, 95% restored, \$500 or trade for V.W. Torrance, DA 3-1026. A

**Router**, Stanley mod. R2-L w/GA-65A base, 115V, 60 cps, 15 amps, 15,000 rpm, \$75 or trade for .22 caliber auto., revolver or 16-20 ga. shotgun. Box 2206. M

**Volkswagen**, 1962, good condition, \$1000 or trade on 1966 Variant. Manhattan Bch., 372-3878. M

**Rides and Riders**

**Rides Wanted**

**7 a.m. — 3:42 p.m.**

**Inglewood Ave. & 165th St.**, Redondo Bch. Harriet J. Chaney, Norair, ext. 2170, 370-7702. B

**7:30 a.m. — 4:12 p.m.**

**Manchester & Vermont**, Los Angeles. J. Curtis, Norair, ext. 1581. B

**Washington & La Brea**, Los Angeles. Gus Barnes, Norair, ext. 1095, 931-3468. B

**8 a.m. — 4:42 p.m.**

**Carson & Los Coyotes**, Lakewood. Philip A. Shubin, Nor. Anaheim, ext. 1194, 421-7029. B

**Firestone & Lakewood Blvds.**, Downey. Earl A. Hart, Norair, ext. 2616, WA 3-1775. B

**Rides Offered**

**8 a.m. — 4:42 p.m.**

**Carson & Los Coyotes**, Lakewood. Philip A. Shubin, Nor. Anaheim, ext. 1194, 421-7029. B

**Firestone & Lakewood Blvds.**, Downey. Earl A. Hart, Norair, ext. 2616, WA 3-1775. B

**Your Voice From Home Free to Your Serviceman**

Northrop employees with members of their immediate family on duty overseas or confined to any military hospital may be interested in a new program called "Voices From Home."

This American Red Cross-sponsored program allows families to record special messages to the servicemen. At the same time a Polaroid photograph is made. The message and photograph are mailed direct to the servicemen who may play the recording at Red Cross facilities around the world.

Two South Bay area service centers offer this service. They are located at 279 W. Beach St., Inglewood, and 1499 W. First St., San Pedro. Check the individual center for hours this service is available.

**TIME TO POST OVERSEAS MAIL**

The time is at hand for mailing Christmas items to members of the armed forces overseas, the Post Office Department reminds.

Parcels and greeting cards to be sent via surface transportation must be dispatched by November 10. Air mail transportation items must be posted between December 1 and 10.

Surface mail bound for Alaska or Hawaii should be posted no later than December 15 to insure pre-Christmas delivery.

## Vocalists, Attention! Symphonaires Need You Right Now

The Northrop Symphonaires, who are making preparations for their annual series of Christmas shows, are holding auditions for prospective members.

The Symphonaires, a 30-voice mixed chorale, present their Christmas programs each year for hospitals, churches and other audiences.

Their first show this year will be on December 3, when they will sing for the Norair Management Club at the Airport Marina Hotel.

On December 17, they'll be at the First Methodist Church of Inglewood. Their own show, a version of Charles Dickens' "A Christmas Carol," will be open to the public. No date has been set.

Auditions will be held during the group's weekly meetings, which are held from 7:30 to 10 p.m., Tuesdays, at Hawthorne High School, 4859 W. El Segundo Blvd.

The director is Paul Brizuela, a former member of the Roger Wagner Chorale.

## R&D

(Continued from page 2)

Each senior research engineer in Manufacturing R&D is a specialist with extensive background in the shops, laboratories and production environments. He spends a part of each year on tour of key facilities across the country to determine what is being done or about to be done in his specialty field. He keeps abreast of trade publications, journals and special reports. He also serves personally on local and national engineering committees pertaining to his field. He has compiled an extensive library of background material that is catalogued and filed within the group.

The end result is a well-rounded specialist who can speak with authority on what has been done, what is being done and what may be done in his field of endeavor.

Such men and their planned extensive knowledge make it possible for Manufacturing R&D to react quickly to any situation, to present the latest facts and to offer the best possible current solution to many problems.

Currently, Manufacturing R&D is deeply involved in future programs, in work on the SST effort, the Boeing 747 program and a wide variety of others.

For example, detailed analysis is being made of the production needs for the 747 project. Typical is assistance in the design of a dual automatic riveting machine of an unusual sort.

This machine will be capable of placing from 14 to 40 rivets per minute, dependent upon the contour of the component. Each rivet placed will involve nine manufacturing operations. Thus, with two and a half million rivets per month at production rates, machines will perform 25 million manufacturing operations each month for about 10 years, or 3 billion.

## SCC Awards Nov. 18

Sports Car Clubbers will present trophies to winners of the NRC Championship Slalom at their November 18 meeting. Activities start at 7:30 p.m. at the NRC Clubhouse.



## Big Jig Moves To Boeing For The 727

The largest jig ever built by Northrop Norair—all 30 tons of it—has been sent to The Boeing Company for use in that firm's 727 expansion program.

The huge tool is 16 feet wide, 14 feet high and 56 feet long. It will be used by Boeing's commercial manufacturing division for enlarging the 727 to accommodate up to 58 more passengers or an additional 7500 pounds of freight.

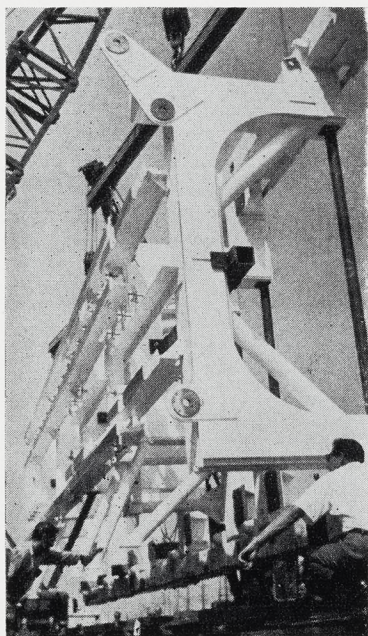
Despite its size, the jig is small compared to the tools expected to be built by Norair for Boeing's 747 program. The 747 fuselage radius is nearly twice the size of the 727's, and jigs for the 747 may be as large as 25 feet high, 25 feet wide and 80 feet long.

### 3 Major Sections

The jig was disassembled into three major sections for shipping by rail to Renton, Washington, and the sections then were lifted by cranes onto railroad flatcars.

The largest sections had to be loaded on their side, as they would have been too wide to travel on commercial rail routes had they been upright.

Because of their size and weight, it took the jigs a full week to make the trip to Washington.



A section of a 30-ton jig of The Boeing Company's 727 fuselage expansion program lies on its side as it is secured to railroad flatcar.

### —TED—

(Continued from page 1)

#### They Were On Team

Aiding in the development of the TED were Don Eakin, senior engineer; Engineer Al Dudacek, who conducted the systems check-out tests; Manny Fimbras, senior mechanical engineer, who worked on design; and Mario Artavia, the engineer who prepared the printed circuit board layouts.

Bob Rodgers of Applications Engineering worked closely with Oaxaca during creation of the TED.

The system is similar to ALOTS (Airborne Lightweight Optical Tracking System), also built by Nortronics. ALOTS is used at Cape Kennedy for airborne tracking of space shots.

#### Bridge Club Meets

The Nortronics Anaheim Bridge Club will hold a regular monthly master point event at 7:15 p.m. tomorrow at NRC Clubhouse, Fullerton.

## Northrop Helps Support Nike-X Development



X MARKS THE SPOT—Members of Northrop Support Operations Nike-X program staff form letters 'NX' to make sure fellow employees in Huntsville, Alabama, know they take pride in their contribution to national defense. Assigned to NSL's Huntsville department, the Nike-X staff supports advanced anti-missile development at Army's Redstone Arsenal.

Nike-X, the largest missile weapon system ever undertaken by the U.S. Army, is receiving valuable technical support from Northrop.

The program, one of the most advanced defense projects in development, has its headquarters in the Army's Redstone Arsenal in Huntsville, Alabama.

Nearby, in the Northrop Space Laboratories Huntsville building, the 33-engineer Northrop Nike-X department supplies technical support services, including studies and evaluations in pre-production planning, for the huge system.

Nike-X is being developed as a defense against long-range ICBM's as well as submarine-launched missiles. A three-stage missile, the Zeus, is being readied to intercept targets still outside the earth's atmosphere.

#### For Use Against Warheads

Zeus' two-stage partner, the high speed Sprint, is designed for use against missile warheads which have already re-entered the atmosphere and are at relatively short ranges.

Northrop's Nike-X project section is a part of the Huntsville department of NSL reporting to J. A. Barclay.

Heading the section is W. G. Bennett, project manager. Aiding him are Dean J. Madsen, director of Production Engineering; Wil-

liam E. Moran, chief of Production Planning; Robert E. Bareford, chief of Logistics and Training; Clifford M. Hoch, chief of Resources Study and Analysis; and Eric M. von Hurst, supervisor of Project Control.

Their responsibility is to provide Army personnel with independent studies in such fields as automated management systems, a work breakdown structure, evaluation of production plans and automated estimating and pricing.

#### Secret Classification

Also a Northrop Nike-X project function is to perform studies in production engineering, product assurance, procurement, configuration management, logistics, training, site activation, and master planning and control.

Most sections of the project carry a secret classification. Northrop work is not done at the Arsenal. Northrop Nike-X personnel meet daily to coordinate planning with Army representatives, but the emphasis is on independent work by the Northrop engineers.

Their findings then are submitted to the Army's Nike-X Project office in written reports.

The system itself is an outgrowth of planning which began in 1957, when the project then was designated the Nike-Zeus Anti-Missile Missile System.

In January 1963, it was renamed the Nike-X Missile Defense System. Northrop is in its second contract year of providing support.

#### Archers Set Meet At Fullerton, Nov. 15

Members of the NRC Archery Club at Anaheim have it all over participants in other active sports. They can hold target shoots and regular meetings at the same time and place.

Such a dual arrangement comes off November 15 at NRC Clubhouse, Fullerton. At 7 p.m. a movie will be shown. A short business meeting follows. Then a new portable target setup will be rolled out and a 20-yard match staged. A novelty shoot will follow for those who care to enter.

#### Bloodmobile To Visit Hawthorne Complex

Volunteer blood donors from all Northrop facilities in the Hawthorne area will turn out December 1 and 2 for a bloodmobile visit to the NRC Clubhouse.

Extra emphasis is being placed on this visit, the last of the year, to help carry blood reserves through the yearend period which traditionally means greater demands for blood and lower donations.

### —JA—

(Continued from page 1)

R. H. Russell (production), and R. L. Stuffer (sales) of Anaheim are counseling a firm called Styro-Lite. A winking Santa Claus is the firm's product for the first half of the business year.

Officers of Styro-Lite are Chris Thayer, president, who also worked in the winning firm last year; Sue Fischer, treasurer; Pat Nebergall, corporate secretary; Keith Fischer, vice president-sales; and Stevan Fischer, vice president-manufacturing.

#### Serve Orange County Firms

Anaheim's Leo Gross and Cy Seeley, both veterans of the JA program, are serving these and other Orange County firms as special advisors.

Art Johnson (management), Neil McKenzie (production) and Ralph Brant (sales) of Nortronics Hawthorne and Palos Verdes are advisors to a firm called HESKO which will market a highway emergency safety kit.

HESKO officers are Rick Myers, president; Joyce Sykes, corporate secretary; and Tom Fowler, treasurer. Vice presidents for sales and manufacturing are yet to be named.

In addition to the work of volunteer advisors, Nortronics and other Northrop organizations provide additional support to Junior Achievement activities through financial assistance.

#### Management Club Annual Dance At Biltmore

Nortronics Management Club members have selected the beautiful Biltmore Bowl of the Biltmore Hotel for their annual dinner-dance, November 18.

Reservations for this affair, the "big" social event of the year for the club, will be taken through Friday.

The tab per person is \$6.

It includes a menu choice of prime rib or lobster, plus an interesting entertainment program and dancing as well.

Booked to appear are the Matty Malneck Orchestra; George Hopkins, comedian; Tommy Cooper (Mr. Personality); the Hardy Family and lovely Colleen Lovett, vocalist.

Reservations for club members and their guests are being taken at each Nortronics facility, President Pat Brown reports.

#### Tennis Club Kickoff

A newly organized NRC table tennis activity for the Hawthorne area will kickoff at 7 p.m. November 10 at NRC Clubhouse. Those interested are invited to turn out and help plan future competitive events.

## Toastmasters Set New 1967 Goals

Toastmasters, under the able direction of newly elected president Al Monteith (Norair), have begun an energetic program to upgrade speaker eloquence. Mr. Monteith has assigned Hank Greenberger, vice president, education, to spearhead the task.

Mr. Greenberger said that the "Speechcraft" program would help participants to attain greater fluency to present ideas in concise and dramatic ways and involve phases of leadership training. He said, "Anyone, and that means the general public, is invited to participate in the program."

#### They're Ready To Participate

Monteith also indicated that Toastmasters stand ready to participate in divisional community relations speaking assignments where needed.

Greenberger noted that Toastmasters will engage in an annual competitive meeting with the Westchester Toastmasters, a businessmen's group, for a set of trophy bells symbolizing ringing eloquence.

He said that Toastmasters will hold a combined family Christmas party with the North American Aviation Toastmasters Club.

#### New Officers Presented

At the October 6 meeting of Toastmasters, new officers were presented by outgoing prexy Dave Bean. Besides Monteith and Greenberger, other new officers were: Administrative Vice-President—Jean Louvier (Norair); Secretary—Frank Macias (NSL); Jack Wilson—treasurer; David DuKet—segeant-at-arms (all from Norair). Other executive committee members include Elmer Davis and Dave Bean.

Monteith told members that the theme of the organization for the new term would be "Leadership Through Toastmasters." He emphasized that membership in Toastmasters is open to every Northrop employee.

The Club is sponsored by NRC and it holds a dinner meeting every Thursday from 6:30 to 9 p.m. in Northrop's executive dining room. Details are available by one call to 675-4611, ext. 2486. Nortronics callers can reach Toastmasters by calling ext. 875, Johnson building or ext. 265 at Palos Verdes.

Northrop Nortronics Recreation Club provides a host of widely diversified activities. If you are not doing so now, get aboard the Nortronics Recreation Club activities bandwagon.



FIRST SESSION OF new "Speechcraft" program sponsored by Northrop Toastmasters Club is being planned by Hank Greenberger, club educational vice president (Nortronics), (left) and Al Monteith, club president (Norair).



# NORTHROP NEWS

NORTHROP NORTRONICS

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## Spur Hunt For Special Personnel

"Nortronics is actively seeking a total of 255 engineers and skilled technicians," Elmer Noonan, Nortronics Industrial Relations director, has declared.

"At Hawthorne and Palos Verdes, there is need for 135 engineers and technicians of which 75 position openings are for engineers. At Anaheim, 120 skilled people, including 50 engineers, are required to meet current openings," Mr. Noonan said.

"While the company is advertising heavily in the Los Angeles newspapers and through available communication media," Noonan pointed out, "Nortronics people could help by contacting friends and relatives and telling them of these position openings." Noonan stressed the cash awards (see story this page) which are available to any of our personnel who can help locate and hire people in needed position openings.

### Variety of Openings

Nortronics at Hawthorne and Palos Verdes has immediate requirements for: senior circuit design engineers, inertial component engineers, environmental engineering specialists, aircraft avionics systems engineers, navigation systems evaluation and analysis personnel and reliability engineers.

In addition, there are position openings for senior servo engineers, applications engineers for inertial navigation applications, scientific and systems programmers and maintainability engineers.

### Need Variety of Engineers

Nortronics at Anaheim has need for circuit design stress engineers; ballisticians experienced in drag and stability estimation of flight ballistics in the atmosphere; mathematicians, target analysts and detonation physicists.

Other needs at Anaheim include these positions: countermeasure engineers, reliability engineers, communication engineers, engineering draftsmen, radar engineers, human factor engineers, test engineers, engineering drawing checker, production control and material procedures analyst.

## Company Will Award Cash to Employees For Personnel Referrals

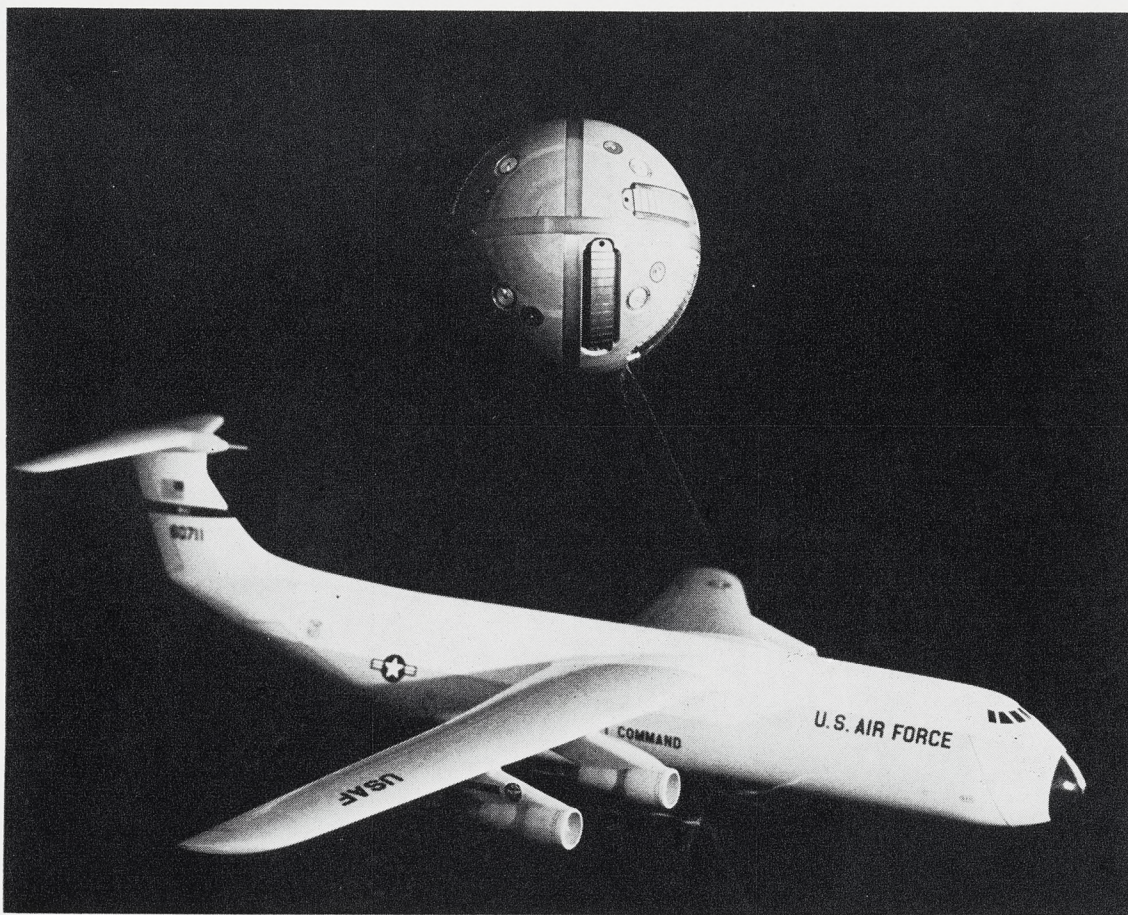
Cash awards await Nortronics people who can help the Division locate and hire needed personnel.

Awards are available through the Referral Award Plan.

Awards vary from \$100 to \$200, depending on the type of skill needed.

Since February of this year, 50 Nortronics personnel have collected a total of \$9100. Payment is made when the referred individual starts his employment.

Referral Award Plan cards are available at lobbies and Personnel offices. These must be completed and forwarded prior to or concurrently with applications for employment submitted by the individuals referred.



SYMBOLIC OF ITS RELATION to the Lockheed C-5 cargo carrier (the world's largest airplane) is this photo of Northrop Nortronics' unique spherical inertial platform, the heart of its inertial navigation system. The sphere posed above a model of the C-5 contains an inertial platform

which floats on a thin layer of fluid inside the large ball. The system features two digital computers combining small size, low cost which has a high computational capacity and reliability. The C-5 program office estimates delivery of the first navigator unit for May 1967.

## Company Has \$100 Million Backlog In Electronics

"Northrop Corporation's backlog of orders in electronics has been rising since 1964, and today has reached a figure of \$100 million.

"The \$100 million figure doesn't include all of our C-5 business which would make the amount even more substantial. Current electronics sales are \$70 million."

So said Ross Miller, Nortronics vice president and manager-Technical, discussing corporate growth at a special November 9 presentation of 20-year pins at Nortronics Hawthorne.

Recipients of the pins were Lloyd Balsam, C-5 Program director; Charles Chidester, senior manufacturing methods analyst; and Adam Krauszer, senior engineer in C-5A platform design.

Miller also discussed Northrop growth in aircraft, space, weaponry and communications as reflected in the company's recent annual report to shareholders.

"The corporate current sales figure for the 1966-67 fiscal year

stands at \$360 million, he said. "The backlog figure, which has increased appreciably, is \$574 million. This shows real stability."

Miller said the sales figure in aircraft is \$170 million, with a backlog of \$340 million.

"More than half of the backlog figure is in military sales," he said, "and most of that concerns the F-5 and T-38.

### In Excess Of Half Billion

"Commercial aircraft business represents 45 percent of the total backlog and includes the Boeing 707, 720 and the initial portion of the 747 program. Northrop's total (See ELECTRONICS, page 6)

## Gemini 12 Success Leads Way To Apollo

The flight of Gemini 12 piloted by James Lovell and Edwin (Buzz) Aldrin has marked a complete series of successes for Ventura recovery systems. Starting with the March 3, 1965 Gemini 3 flight, Ventura parachutes have guided each capsule to successful splashdowns. Gemini 12 splashed down on November 12 to complete the Gemini series.

In fact, all manned U.S. flights, including the earlier Mercury series, have been completed the same way — with a successful splashdown beneath a parachute system designed and manufactured by Northrop Ventura.

Each flight has been a marker toward a manned landing on the moon scheduled for 1969. And, Ventura retains its part in the Apollo program — successor to both Mercury and Gemini—next (See GEMINI 12, page 6)

## Target First C-5 Unit For May 1967

With development of the world's largest aircraft advancing on hundreds of fronts across the U.S., the Northrop Nortronics C-5 program office estimated that the first of the inertial-Doppler navigation systems would be completed by May of 1967.

Nortronics Hawthorne is developing the world's first combined Doppler and inertial navigation system for the Air Force fanjet cargo carrier under a contract from Lockheed-Georgia Company, prime contractor for the C-5.

### Key Executives Meet

A firm configuration for the system was ratified earlier this year at a program review meeting at Hawthorne. Nortronics and Lockheed hold regular reviews of the program at various levels. A recent meeting, for example, was conducted at Hawthorne which brought together key executives for a management-level review.

Representing Lockheed-Georgia at the meeting were: Jack Mann, assistant director of Materiel-C-5; George Curtis, division engineer in charge of all electronics; W. F. Haberman, Materiel administrator for IDNE and Guidance Systems Integration (GSI). I. K. (Bud) Haddox and T. B. (Tom) Miller, Lockheed's resident technical representatives at Nortronics Hawthorne, also attended.

### They Represented Northrop

Representing Northrop were: Fred Stevens, Corporate vice president and Nortronics general manager; Ross Miller, Nortronics vice president and manager of Technical department; Lloyd Balsam, C-5 program director; Howard Sutherland, senior field marketing representative, SE District office (Marietta); Dan Agee, supervisor, Master Planning and Control; Don Chaney, general supervisor of Inertial System Development-Electronics, and Carl McCrady, chief of Inertial Systems Engineering.

The meeting was the second major management review of this important program.

Noteworthy among progress reports by Nortronics on more than a score of program activities was an announcement that all subcontracts on the navigation system had been awarded.

Electronic Memories, Inc., Hawthorne, California, was awarded a contract for more than \$700,000 to produce the memory section for the IDNE's airborne computer. Kearfott Systems Division of General Precision Inc., Little Falls, New Jersey, won a contract for more than \$500,000 to produce inertial platform accelerometers for the navigation system.

A third major subcontract was awarded earlier this year to GPL Division of General Precision, Pleasantville, New York, to support (See UNITS, page 6)



A DISCUSSION OF GROWTH throughout Northrop Corporation is the subject of Ross Miller, Nortronics vice president and manager-Technical, as he addresses employees at Nortronics Hawthorne. As Mr. Miller talks, Harry Clark

of Nortronics Personnel Activities displays business charts. Mr. Miller told the employees that the communications industry will be doing \$60 billion a year worth of business by 1977.





F-5 FIGHTERS FOR REPUBLIC OF CHINA—Northrop F-5 tactical fighters in service with the Republic of China (Formosa) Air Force are shown at Tainan Air Base, Taiwan. The first squadron of F-5s was officially turned over to the Republic of China on Dec. 9, 1965. The aircraft are seen here with the markings of the Chinese Air Force along the fuselage. Fifteen Free World countries in all have acquired

or selected the twin-jet F-5 for their defense forces. Included is the United States, which is using the 1000 mile-per-hour aircraft in Vietnam combat operations, and 14 allied nations in such areas as Europe, the Middle East and Southeast Asia among others. This total of 15 thus makes the Freedom Fighter the most-widely deployed and programmed of any modern supersonic fighter in the world.

## Radhoff Is A Natural To Judge Chute Jump Contest

Competitors in sporting events share a mutual feeling that the best official is one who has participated in all phases of the sport he judges.

That's why Ron Radhoff was a natural selection to judge the 1966 U.S. National Parachute Championships held recently in Oklahoma.

Ron's credentials include:

Almost five years as a sport parachutist; more than 630 jumps; 30 individual awards in competition; extensive experience as a parachuting judge; instruction to over 20 students; and more than 100 parachutes packed as a licensed rigger.

If that's not enough, Ron is also a licensed pilot and flies sky divers preparing to jump when he is not jumping himself.

Ron Radhoff is supervisor of the Technical Data and Graphic Services function at NSL's Huntsville, Alabama, operation.

He, and four others, judged the 1966 nationals which ended with the highest scores ever attained in a national event.

"This leads us to believe the United States team selected from this event will better represent the country in international competition," Ron said.

Competition at the national was held in two events—accuracy and style. In the former, jumpers aimed for a target just 5.91 inches in diameter and received points based on how near they landed to this target. Style, in contrast, considers performance during a



PREPARING TO mark landing of contestant is Ron Radhoff, NSL Huntsville, during the National Parachuting Championships. Note landing disc under contestant's right foot.

pre-determined set of aerial maneuvers while in free fall.

Long hours on the part of judges were required in the nationals. In addition to judging actual events, they were responsible for target areas, optical and timing equipment, supervision of trained judges and various other tasks. At the end of each day they calculated points scored during the day.

Ron has perfected his judging career by serving in the 1966 Southern Conference meet, the 1965 Nationals, and numerous Cottonbelt Parachute Council events.

At present Ron heads the latter Council in over-all points for both style and accuracy for the year and was style champion in 1964 and 1965.

FIRST VNAF PILOT TO SOLO—Norair's Hank Waklee extends congratulations to Major Vo Van Si of the Vietnam Air Force (VNAF) after he soloed in the Northrop F-5. The major is the ranking officer among a 33-man contingent from the VNAF now training in the F-5 at Williams Air Force Base, Arizona. Vietnam has announced plans for equipping its Air Force with F-5's.



## You Can Buy Dance Tickets at Door

Special arrangements have just been completed which will allow Northrop personnel to purchase tickets to the annual all-Northrop Holiday Dance at the door.

The dance comes off this Saturday at the International Hotel.

The cost is a modest \$2 per person, thanks to the combined sponsorship of all NRC Councils. Validated parking is also available at reduced rates.

Alvino Rey and his Orchestra, the Latinaires, the Guideposts and a special intermission group will play for dancing in the International Ballroom, the Rose and Blue Rooms.

Tickets may be obtained today at regular outlets or at the door Saturday night.

## New Schedules for Blood Donors

Volunteer blood donors among Northrop personnel in the Hawthorne area may now obtain a sustaining membership in the blood program which will automatically schedule them for future bloodmobile visits.

This feature begins with the December 1-2 bloodmobile visit to the NRC Clubhouse, Hawthorne.

Signup cards now available at Norair and Nortronics facilities make it possible for a donor to register once and to be called automatically for future bloodmobile visits (one is held each quarter).

## NRC Commissioners Plan Coordinated Publicity

Northrop Recreation Club commissioners and publicity coordinators met on Thursday, November 10 at Rodger Young Auditorium in downtown Los Angeles to plan an integrated news function.

The meeting was sparked by Bill Wareing, Norair NRC president, and representatives from Norair, Ventura and Nortronics who decided to nominate Frank Byers of Norair as temporary news coordinator. All news of NRC will be channeled through Byers who will act in this post until a permanent chairman is named by the NRC Council.

Byers will supply both news and pictures to the Northrop News on a corporate-wide basis.

# AFPR Office Monitors 150 Active Contracts

Lieutenant Colonel Rufus K. Keeling, USAF, likes to boil things down to the essentials.

His command, he says, concerns itself primarily with assuring "form, fit and function."

Which means, in the Colonel's basics, seeing that products Northrop Norair contracts to build for governmental agencies are made according to specifications, fit correctly and function properly.

The yardstick applied is contractual terms. Timely delivery of quality products within established costs are the parameters.

Colonel Keeling is the Air Force Plant Representative (AFPR) for Northrop Corporation. He heads a 71-member organization composed of military and civilian personnel.

See Photos, page 3

Currently, the Northrop AFPRO is administering more than 150 active contracts with a total value of approximately \$550 million.

Many of these cover hardware—the F-5 fighter, the T-38 trainer, replacement and supporting equipment for these and other Northrop products, spacecraft and spacecraft components, limited research and development items, et cetera. Others cover specific services, support operations, studies or proposals involving no hardware.

As a direct representative of Norair's biggest customer—the U.S. government—the Northrop AFPRO is geared to serve any governmental agency doing business with Norair.

### Management Services

This may mean providing routine management services for and technical assistance to the buying agency throughout the life of a contract. Or it may call for the performance of specific tasks delegated by an agency in the interest of shortening decision making time.

Above all, the AFPRO brings the contractor and buyer face to face at the production level.

Staffed by knowledgeable personnel experienced in contractor-buyer relationships, the AFPR Office is set up to interface with many Norair organizations. Major divisions include Development Engineering, Industrial Management Evaluation, Plans and Administrative Services, Safety and Flight Operations, Contract Administration, Production Administration, and Quality Assurance. To these groups fall the responsibility of carrying out day-to-day

activities in a close-knit, teamlike atmosphere with their Norair counterparts.

More than anything else, the Northrop AFPR Office is flexible.

This makes it possible for a relatively small number of skilled people to serve the interest of many buyers, many contracts.

At any given time AFPRO staff members may be working simultaneously on contracts covering aircraft, spacecraft and proposals.

"Seeing that Norair meets its contractual requirements is our prime objective," Colonel Keeling says, "but helping you to do so is equally important to us."

"Reflected in your success, or failure, is a distinct image of the job we are doing. Like everyone else we like a winner and sharing in the elements that make a winner," he adds.

The fact Norair has not missed a hardware delivery schedule since the inception of the F-5 and T-38 programs is a point of intense pride within the AFPRO organization.

And when extra effort was required to provide "Skoshi Tiger" aircraft for use in Vietnam and subsequent follow-on activities, AFPRO personnel were in the thick of things, working the same long hours required and making personal sacrifices.

The AFPRO staff is a team set up to provide assistance to both the buyer and the contractor. It serves a unique role in keeping contract efforts moving toward timely completion.

## Hawaii-Bound Tourists Slate Final Meeting

A final organizational meeting for Hawaii-bound Northrop folk will be held at 8 p.m., December 7 at the Alondra Club, 16411 Prairie, Lawndale.

At that time a drawing will be held among those who have made reservations for the trip to determine the winner of a free trip.

The NRC tour departs December 24 and returns January 2. Reservations are being accepted at all Personnel Activities offices.

A child to educate? Monthly investment of \$37.50 in Series E United States Savings Bonds will grow to \$10,964 at the end of 17 years, assuming the current rate of yield is unchanged during the automatic 10-year extension period.

RECOGNITION DINNER held recently to honor Boy Scouts who attained Eagle rank found Nortronics executives serving as hosts for five Scouts. The men (from left) are Lloyd Balsam, George Chalmers, Mike Turney, Hal Janssen and Ross Miller. Their guests are shown with them.





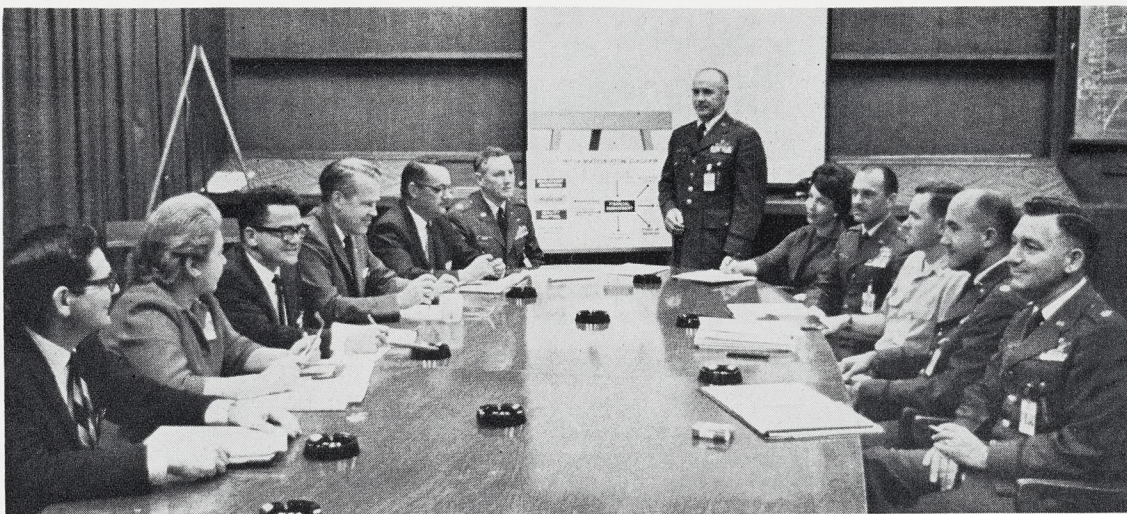
# How AFPRO Helps Company Meet Its Military Contracts

Northrop Corporation's Air Force Plant Representative Office relies on the skills of a talented group of men and women in administering government contracts held by Northrop Norair.

Each day this staff of specialists is in direct contact with Norair counterparts on all levels. This teamwork helps assure the delivery of quality products in a timely manner within costs established by contractual terms.

Elsewhere within Northrop Corporation's West Coast operations, other governmental agencies carry out a similar role.

Defense Contract Administration Services District offices at Anaheim and Van Nuys are responsible for the administration of government contracts being filled at Northrop Nortronics and Northrop Ventura, respectively.



Lieutenant Colonel Rufus K. Keeling stands at head of table where key members of the Northrop AFPRO are gathered. They are (left to right) Josh Treiman, Lucille King, Harry Orlow, Robert Coe, Jess Dennis, Lt. Colonel W. O. Ruddock, Bonnie Buckles, Major Robert Walker, Captain W. Houchin, Major D. L. Pascoe and Major H. D. Clarke.



Verification of Northrop Norair inspection is a major activity of the AFPRO staff. Carried out on a random selection basis, verification touches all production phases. Here Norair Inspector R. S. DeArmond (left) confers with J. K. Krogstad of the AFPRO Quality Assurance staff.



Keeping tabs on the hundreds of government-owned pieces of equipment employed by Norair is another key function of the AFPRO. Jim Gnotta (left in center picture) and Myer Miller check papers on a numerically controlled drill, one of 33 machines valued in excess of \$50,000 used by Norair. A newer function of AFPRO is industrial management evaluation with aspects shown in presentation charts held by Marvin Sackett (right).



The men above, representing a majority of AFPRO functions, will have responsibility for evaluating all Norair proposals involving the F-5 and T-38 programs during coming year. They are (left to right) F. L. Harris, R. H. Coe, H. J. Orlow, R. J. Wellman and Larry Bartlett.



The AFPRO Development Engineering Division works closely in helping Norair carry out contracts of a developmental or research nature. Major H. D. Clarke (left) and Larry Bartlett (right) confer with Norair's J. A. Petzold before static test stand.



Last stop for Norair-built aircraft prior to flight is the Final Assembly line at Palmdale. Two AFPRO Quality Assurance representatives, William Markowitz (left) and Bernard Hirsch, perform final verification routines.



Major D. L. Pascoe, AFPRO head of Safety and Flight Operations, radios control tower for taxi instructions as he prepares to take a T-38 trainer up for the final Air Force verification, flight acceptance, at Palmdale.



## Northrop Freedom Fighter Praised By Time Magazine

"So maneuverable is it that pilots claim that 'under 30,000 feet, the F-5 can lick anything that flies—no matter how fast it is'."

So says *Time Magazine's* November 11 edition in a 600-plus word article devoted to Northrop Corporation and the Norair-built F-5.

Accompanying the article was a picture of four 1000-mile-an-hour F-5's, flying in close, side-by-side formation.

"So far," the story said, "some 300 F-5's have been purchased by 15 countries, ranging around the globe from Ethiopia to Canada to South Korea. On the books, Northrop has orders for 800 more, worth a total of \$600 million."

### Highly Complimentary

The highly complimentary story called the F-5 "a lot of plane for a price tag of \$900,000—about a third of the cost of the F-4 Phantoms the U.S. is using in Vietnam."

"With a razor-thin wingspan of only 27 feet, the F-5 can carry ordnance, including nuclear bombs, weighing up to half of its own six and one-half

ton weight. That makes it, pound for pound, just about the biggest payload carrier of any supersonic plane.

The plane was built to meet the request of Thomas V. Jones, Northrop president and chairman, "for a supersonic jet that can survive and win in a sky full of MIGs."

### Sales \$359 Million

The magazine said that Northrop's fiscal sales in 1965-66 were \$359 million, nearly half of that amount in aircraft.

Belgium and The Netherlands are the most recent Free World nations to purchase F-5's.

Canada is building its own version, the CF-5, under license to Norair. Ethiopia, Norway, Greece, Spain, the Republic of Korea, Turkey, the Republic of China and the Philippines are among others employing the F-5.

The plane was first used by American forces in Vietnam in October 1965 as part of Operation Skoshi Tiger, an intensive evaluation.

Following the successful evaluation, the F-5's were turned over to the Air Force's 10th Fighter Commando Squadron.

## Col. Ruddock New Deputy For AFPRO

Lt. Colonel William O. Ruddock has assumed duties as deputy commander of the Air Force Plant Representative Office for Northrop Corporation.

Prior to his new assignment, Colonel Ruddock was assigned to the Boeing Wichita AFPRO for four years. He served as chief of Electronics Systems for three years and as Air Force Plant Representative at Beech Aircraft Corporation for nine months.



Colonel Ruddock was born in North Carolina. He is a graduate of Clemson University. He has completed advanced studies at Texas A&M University. Entering the Air Force in 1943 via the Aviation Cadet Program, Colonel Ruddock was commissioned in 1944. He has logged more than 5600 flying hours in bombers, including 2200 in jet bombers. He completed two combat tours, one during World War II in B-17's and the other during the Korean Conflict in B-29's. He left the Air Force in 1946 to attend college, but was recalled in 1950 and has served continuously since that time.

## NRC To Host Children At Yule Show

Personal invitations to NRC's gigantic Children's Christmas Show were distributed today with the paychecks of all Northrop Corporation personnel in the Hawthorne area.

This show, the "big" event of the year for the younger generation, has traditionally been a favorite of parents, too.

It is scheduled this year for the Hollywood Palladium on December 17. Show times will be at 10 a.m., noon and 2 p.m.

Santa Claus will make his traditional appearance and present an outstanding array of performers.

"Mr. Patch" and clowns galore will be on hand, along with Manny Brown's Orchestra, the Carlson Jugglers, Captain Ross King and his Poodlaires, the acrobatic Lyons Family, and Claudet, the Magician.

Invitations this year are in a special form. They ask each employee to specify how many guests he will bring. Upon receipt of this information, NRC will dispatch sufficient tickets for the family to a specific show, plus a free privileged parking ticket at the Palladium lot.

Here's a word of caution: admission will be by ticket only, so return those reservation forms immediately. Be sure they are posted well in advance of the December 5 deadline.

(Editor's note: This show is being presented for all Northrop Norair employees and their families, plus Nortronics employees at Hawthorne and Palos Verdes. Nortronics Anaheim will hold its annual children's party December 18 at NRC Clubhouse, Fullerton. Information on this event will be forthcoming soon.)

## Norair Secretary's Memory Lives On As Employees Help Minister Earn Degree

A man who will soon become a Presbyterian minister will never forget the help given him by a woman he never met.

He is Gary Smith, a student at the San Anselmo Theological Seminary, near San Francisco, and she was Mrs. May Johnstone, a Northrop Norair secretary for 17 years until her death, last July.

Mr. Smith, a member of the First Presbyterian Church of Inglewood, had been forced to take a full-time job to maintain his theological studies and still provide for his wife, son and daughter.

Mrs. Johnstone, a member of the same church, heard of Mr. Smith's problem and decided to help.

Through a bulletin from the church, Mrs. Johnstone heard of a scholarship fund to assist Mr. Smith through his final year of studies (he'll graduate next spring), but she died before the fund drive began.

### Continue Fund

As a memorial to Mrs. Johnstone, other Norair employees continued the scholarship fund and sent their contributions to Mr. Smith, an Air Force veteran. The contribution from this fund was \$163.

Because of that contribution and others from members of the church, the future minister was able to resign his job and concentrate exclusively on his studies.

In a letter written to Mrs. Johnstone's friends at Norair, he expressed "astonishment, gratitude and humility over the generous contribution."

"These are more than random words," the letter said. "They do in fact signify special meaning for me."

"Astonishment — because I did not know May Johnstone at all, and I certainly was not aware that she concerned herself with our welfare."

"Gratitude — because of the concrete financial assistance this gift represents. To be surprised by a check which covers 20 percent of my rent this final year really



FUTURE MINISTER Gary Smith was able to resign a full-time job and concentrate on his studies, partially because of a contribution sent to him from Northrop Norair employees as a memorial to Mrs. May Johnstone, who died in July. Shortly before her death, Mrs. Johnstone had expressed her intent to help him. With Mr. Smith are his wife, Diane; daughter, Rhonda, 10; and son, Scott, 8.

eases the economic strain which plagues a family man's study.

"Humility — above all — because every gift humbles one, and the many gifts which poured in recently compound this feeling."

"All I can do in return is resolve to intensify my study and my commitment to the people of God's world, so that my ministry may somehow justify May Johnstone's confidence and your generosity."

Mrs. Johnstone joined Northrop on May 20, 1949. At the time of her death, she was a secretary in Data Processing.

### Northrop Symphonaires Book Three Concerts

Three engagements have been booked by the Northrop Symphonaires for the coming holiday season.

The choral group sings for the Norair Management Club, December 1; the NRC Council, December 10 and takes part in the annual Centinela Valley Fine Arts Music Festival December 20.



NEW NORTRONICS PALOS VERDES-HAWTHORNE NRC officers. (L. to R.) Richard Paramore, president; Maury Shulman, vice president; Dorothy Baldwin, secretary; Jeanne Andrecht, treasurer and Danny Gravlin, sergeant-at-arms.



NEW NORAIR NRC OFFICERS—(L. to R.) Jim McKanna, new president; Dick Cade, incoming vice president; Dorothy Wal's, secretary; Bill Lewis, treasurer and Fred Griffin, sergeant-at-arms.



KEYNOTER FOR PILOT-TRAINEES—Dan Darnell, jr., manager of Norair Customer Relations, was a recent guest speaker at the October 21 graduation ceremonies for pilots at Webb Air Force Base, Texas. He is shown here with Air Force officers at the base. (L. to R.) Colonel George E. Franks, air base group commander; Colonel Michael W. Shareck, jr., commander, 331st Fighter Interceptor Squadron; Darnell, Colonel Chester J. Butcher, wing commander; and Lt. Colonel Mount E. Frantz, commander, 3560th USAF Hospital.



ALVINO REY will be the feature entertainer at the all-Northrop Holiday dance on November 26 at the International Hotel, Los Angeles.



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

# Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

Wanted to Buy
Pups, miniature Dachshund, AKC champ. stock, 2 black males, 1 red female, males, \$60; female, \$70. Torrance, DA 5-7806. A
Trailer, 1-wheel, spare tire & tube, \$40. Los Alamitos, GE 1-0843. A
Dishwasher, GE portable, used less than 1 yr., \$115. Torrance, 326-6195. A
Ford, 1959, V-8, recent major tune up, \$300. Harbor City, DA 6-2907. A
Acreage, 5 acres near Willow Springs, on good road, low dn. & low monthly pymts. incl. 6% interest, \$2975. Torrance, FR 8-1026. A
Falcon Ranchero, 1963, r/h, 6 cyl., auto., \$699.50. Burbank, 846-1016. A
Thimblebrome Racers, Cox, 3 ea. w/gas engines & misc. parts, \$10. Huntington Bch., 714-847-2648. A
Watch, gold, 18 carat Movado, second hand, day of week, date & month dials, \$20. Marina Del Rey, 823-2655. A
Executive Desk, walnut, large size & desk lamp, \$110. Hawthorne, OS 5-8091. A
TR 4A, 1966, racing green, wire wheels, Pirellis, \$2350. Manhattan Bch., 374-0940. A
Dinette Set, oval white Formica table top, teak legs, Danish modern, 4 chairs, \$18. L.A., 474-0814. A
Lamp Table, Duncan Phyfe, mahogany, \$12. Gardena, OS 5-5258. A
Pontiac, 2-dr. sedan, Grand Prix, extras, \$1395. Box 2301. A
Carpet, 9x12 beige-ivory tweed, 100% Nylon pile, cost \$65; \$30. Torrance, 326-5731. A
H. O. Trains, w/supplies & cab control or larger than normal layout, run trains from 3 different locations, lots of equipment, \$100. Lawndale, 371-7311. A
Cabin Cruiser, 28' x 9' beam, 115 h.p. Chrysler Crown, plank hull, galley, sleeps 4, helm in cabin, \$1200. Long Bch., WH 4-1406. A
Train, Lionel elec., freight & pass. cars, switches, extras, \$95. Hawthorne, OS 6-3886. A
Positraction, rear end 4:56, fits late models Plymouth & Dodge, \$90. Inglewood, 671-2959. A
Porta-Crib, \$10. Torrance, 325-2730. A
Accordion, Contello 120-bass, 3 switches, carrying case, \$75. Manhattan Bch., 379-5366. A
Home, 3-bdrm., ocean view, 4 blocks to King Harbor, near schools & shop., interior completely redecorated, 40x120 lot, \$22,000. Manhattan Bch., 374-4223. A
Dining Room Set, Virtue Bros., 6 chairs, 2 exts., beige & gold, Nev-A-Mar top, \$50. Hawthorne, 676-1441. A
Oldsmobile, 1961 Holiday cpe., r/h, w/s Premium tires, p/s, p/b, \$1025. Fullerton, 714-528-8582. A
Recorder, tape & dictating, solid-state transistorized w/carrying case, foot control, & earphone kit, \$139. Hawthorne, 679-5436. A
Volkswagen, 1966 sunroof, 1300 cc, 13,000 miles, \$1895. Hawthorne, 679-7662. A
House, 3-bdrm. & beam-ceiling den, 2-car detached gar., fenced play yard, near fwy. & schools, loan avail., consider low down, \$21,900. Gardena, DA 9-2904. A
Enlarger, 4x5, Federal, drier & all dark room equip. incl., \$50. Lynwood, NE 5-3294. A
Sofa, & chair, \$25. Hawthorne, 676-3883. A
Accordion, Contello, w/case, orig. cost \$395; \$150. Gardena, 329-9484. A
Infant Seat, \$4. Westminster, 897-2161. A
Motorcycle, Ducati Scrambler, 1965, stripped for dirt, eng. o/hauled, extra sprockets, hvy. suspension, misc. extras, \$400. Hawthorne, OS 5-4239. A
Barracuda, 1966, radio, p/s, auto. trans., V-8, console, 8000 miles, \$2590. L.A., 837-4596. A
Dodge, 1955 2-dr. V-8, r/h, auto. trans., \$100. P.V., FR 7-4317. A
Lot, large, o/looking ocean, \$1000 dn. or more at option of buyer, owner will carry bal. at 6.25%, \$12,500. Rolling Hills Ests., 377-0146. A
Jig Saw, 18" w/stand & motor, \$20. P.V. Pen., 377-9842. A
Mercury, 1962, convt., custom Monterey, p/s, p/b, p/w, new tires, 1-owner, 32,000 miles, \$850. L.A., 476-3418. A
Tape Recorder, stereo & microphone, Phillips, 4-track, 4-sps., 7" reels, \$125. Huntington Bch., 962-6429. A
Honda, 1964, 55 sport, \$225. Hawthorne, 676-3142. A
Chest-of-Drawers, bookcase & chair, \$50. Hawthorne, 675-7965. A
Electronic Equipment, Eico VTVM, model 221 & Heath oscilloscope, model 0-5 w/extended range, \$50 or sell sep. Torrance, DA 8-8273. A
Pontiac, 1965 GTO, 389 eng., air cond., p/w, p/s, auto., many other extras, 25,000 mi., orig. owner, \$2500. Norwalk, 868-7402. A
Guitar Amplifier, Gibson Titan 3, orig. cost, \$695; \$350. P.V. Pen., 377-7670. A
Bar Stools, 2 Danish modern, \$15. Gardena, 635-3127. A
Mobile Home, 1964 Universal, extended living & dining rm., unfurn., 1-bdrm., porch & awning, skirts, evaporative cooler, w/w carpet, in East Anaheim, \$5695. Anaheim, 533-3649, 772-5754. A
Radio Transmitter, amateur, Heathkit DX100, \$55. Hawthorne, OS 6-6949. A
Lot, 75' frontage on Palo Verde lagoon by 136' deep at Palo Verde, Calif., \$9000. Gardena, 213-324-1566. A

For Sale
Stereo, Hi-Fi components, AF/FM tuner, dual amplifiers, dual preamps, dual cross-overs, 4 speakers, stereo turntable, \$74. Hawthorne, 799-9476. A
Range, O'Keefe & Merritt, gas, \$35. Torrance, 329-9021. A
Aircraft Batteries, rebuilt, new guarantee, \$20 & up. L.A., 755-8018. A
Home, 2-bdrm., w/15 x 30 swimming pool, 2-car gar., fireplace, garb. disp., new cpts., 4 terraces, lge. lot, will carry second, \$26,000. El Segundo, EA 2-6595. A
MG-TD, 1953, all rebuilt, new upholstery, top, tires & paint, \$1100. Harbor City, 534-0383. A
TV, 1960 Zenith 21", tuner needs repair or replacement, \$30. Hawthorne, OS 5-5574. A
Tricycle, Murray 16", ball bearing wheels, \$9. Torrance, DA 9-2016. A
Dishwasher, General Electric convt., front load type, still under warranty, \$170. Yorba Linda, 528-9227. A
Desk, maple, \$50. Hawthorne, OS 5-6331. A
Rambler, 1963, Amb., V-8, AM/FM radio, p/s, p/b, o.d., b/s, console, \$995. L.A., 475-1497. A
Movie Projector, Bell & Howell, 8mm, \$50. Inglewood, OR 1-2429. A
Oldsmobile, 1964, F-85 station wagon, p/s, p/b, p/rear window, auto. trans., factory air, 2 new tires, \$1575. Inglewood, PL 4-7861. A
Power Mower, King O'Lawn, front throw, 18" \$75. Gardena, 327-1683. A
Dress Form, size 12, short waisted, un-adjustable, \$5. Torrance, 329-6748. A
Movie Camera, 8mm Mansfield Holiday auto. zoom lens, pistol grip, leather case & tripod, used 3 times, \$60. Lynwood, 638-3423. A
Living Room Furniture, couch, matching chair, contrasting tub chair, coffee table, 2, 3-tiered used 7 mos., \$280. Gardena, 327-5825. A
Camper, 8' Camp-A-Long, 3-burner butane stove, ice box, water tank, sleeps 2, \$500. Los Alamitos, OS 6-7122. A
Cemetery Lots, in Inglewood Park cemetery, \$938. Redondo Bch., FR 8-9741. A
Transmission, Chev. Powerglide, \$50. Hawthorne, 679-5371. A
Pontiac, 1937, cpe., orig. cond., \$225. Hawthorne, 676-9953. A
Condominium, 4-bdrm., 2½ baths, fireplace, elec. kitchen w/bltins, cpts., dps., swim pool, putting green, rec. hall, owner will finance 6¼% or lease \$225 mo., \$31,500. Torrance, 324-6137. A
Thunderbird, 1959, \$500. Hawthorne, OS 9-6215. A
House, 3-bdrm., 2-bath, 20' x 16' covered patio, new cpts. & dps., in Torrance, 5¼% FHA mortgage, \$141 mo. pymts., \$25,500. P.V. Pen., 377-9666. A
Sofa-Bed, Riviera, dble. bed size, black & white tweed, \$50. Gardena, 321-2848. A
Relax-A-Cizor, elite model, has hip, abdomen, & facial attachments, used 5 times, \$65. Compton, 774-1778. A
Radial Arm Saw, complete, Craftsman, 10", color coded controls, lge. 20% x 40" table develops 2 h.p., auto. friction lock holds carriage, electro-magnetic brake, \$135. Torrance, FR 1-1365. A
Home, 4-bdrm., 2-bath, family rm., 2 yrs. old, 5½% loan on first t.d., 1 mile from Research Park, \$37,900. P.V. Pen., 377-5172. A
Wedding & Engagement Rings, white-gold diamond, orig. cost \$700; \$350. Hawthorne, 679-2456. A
Honda S-90, 1-yr.-old, 100 mpg, dual mirrors, luggage rack, helmet, tool kit, cost \$450; \$325. San Pedro, TE 3-4272. A
Girl Scout Uniforms, 2, sizes 8 & 10, incl. dress, beret, belt, tie, & banner, each worn 3 times, \$5 ea. Gardena, 329-9248. A
Honda, C-110, 5 h.p., black & chrome, \$195. Buena Pk., TA 8-2815. A
Piano, \$50, other misc. items & clothing. Torrance, 370-2794. A
Ford, 1955, 2-dr., stick shift, r/h, new seat covers, battery, tires & shocks, \$235. Port. Bend, 377-3482. A
El Camino, 1965, 327 cu. in., 300 h.p. 4-spd. trans., p/s, new tires, \$2250. Hawthorne, 679-9312. A
Reducing Couch, elec. motor, deluxe, 3-sections for easy storage, sandbag weight, \$50. Van Nuys, 213-344-6948. A
Camper, home-built, for ½-ton short bed, 4 bunks w/foam rubber pads, fully insulated, \$100. WALTERIA, FR 8-6354. A
Ski Boat, 14½' Performer, refinished inside & out, 70 h.p. Merc. motor, full elec., new tires & tubes on trailer, all equipment, \$650. Palmdale, 805-947-3476. A
Thunderbird, 1962, coupe, factory air cond., power windows, 58,000 miles, \$1500. Ventura, 805-643-3566. A
De Soto, 1956 4-dr. h/top, big Hemi-head eng., 4-bbl. carb, needs timing chain, \$95. Anaheim, 774-2779. A
Washing Machine, 1956, Whirlpool Imperial MK VII, 1 year since o/haul, needs trans. work, \$15. Gardena, FA 1-1655. A
Thunderbird, 1962, orig. owner, low mileage, air cond., new custom tires, \$1650. Inglewood, PL 6-3950. A
Corvette, 1962, 327 eng. 340 h.p., 4-spd., positraction, removeable h/top, \$2000. Hawthorne, 322-2544. A
Dodge Coronet, 1965, 500, V-8, auto., 26,000 miles, \$1850. Torrance, 371-2389. A

For Sale
Surfboard, Greg Noll, 9'3", \$45. Inglewood, PL 6-7681. A
Adding Machine, Burroughs 10-key elec., sub-tracts & multiplies, recent model, \$85. L.A., GR 2-3023. A
Pickup Trailer, all metal, 3½' W x 5' L x 1' D, \$60. L.A., 670-4557. A
Bicycle, boy's 20" Sting Ray-type, \$18. Gardena, DA 9-4675. A
Volkswagen, 1965 sedan, r/h, good tires, serviced regularly, s/belts, \$1350. Anaheim, 635-2187. A
Beach Home, ½ block to ocean, lge. lot, 2-bath, modern kitchen, 2½ gar., lge. patio, small down, immed. occupancy, \$37,500. Hawthorne, FR 9-3353. A
House, 1½ miles to Northrop Ventura, 3-bdrm., 1¾ bath, family rm., dps., shutters, cpts., patio, fully landscaped, sprinklers, custom features, 10% down, \$22,000. Newbury Pk., 805-498-3043. A
Sprite, 1962, r/h, w/s/w, t.c., 1-owner, \$799. P.V. Ests., 375-6971. A
Organ, Lowrey spinet, maple, w/chimes, percussion & Hawaiian guitar features, \$595. Torrance, 323-6717. A
Scooter, Allstate compact, \$150. Inglewood, 672-3147. A
Wedding Dress, traditional princess style, white silk taffeta w/train & applique around neckline & 3 petticoats attached, \$60. Rolling Hills, 831-9707. A
Pontiac, 1963 G.P., fac. air, r/h, p/s, p/b, w/s/w tires, alum. wheels, low mileage, \$1995. Huntington Bch., 714-847-0648. A
Organ, Hammond M-3 spinet w/percussion, unmarred maple finish, \$750. San Pedro, 831-5837. A
Light Plant, homemade, 6-V bat., '54 Chevy gen. & voltage reg. & ammeter, ¾ h.p. Briggs & Stratton motor, \$25. Torrance, 328-1076. A
Pups, airedale, champion stock, \$125. Hawthorne, 698-2785. A
House, 4-bdrm., family rm., 2½ baths, 1 acre, horses ok, near Northrop Ventura, \$35,000. Somis, 805-482-1186. A
Chevrolet, 1957 Nomad, p/s, p/b & p/w, air cond., 283 cu. in. eng., \$950. Hawthorne, OS 9-8687. A
Corvaire Monza, 1964 convt., r/h, p/operated top, safety padded dash, 110 h.p., twin carbs., 4-spd. shift, w/s/w tires, low miles, \$1200. San Pedro, 831-5283. A
House Car, Metro truck w/Jeep eng., complete w/cpts., stove, w/oven, 10-gal. water tank, 8.5 gal. but. tank, 2 beds, each sleeps 2, 1 single bed, \$900. Torrance, 328-7234. A
Chevrolet, 1957 Bel Air h/top, new rebilt. 301, dual quads, Chevy fuel injection cam, b/seats, 3-spd. stick, chrome wheels, \$700. Hawthorne, 679-7020. A
Plymouth, 1960, station wagon, p/s, Hydro. rear window, 6-cyl., \$533. Redondo Bch., 374-1124. A
Trailer, 15' Field & Stream, gas stove w/oven, elec. brakes, 2 butane tanks, sleeps 5, \$650. Hawthorne, 675-6571. A
Corvaire Monza, 1963, 4-spd., radio, new tires, \$800. Inglewood, 673-3503. A
Refrigerator, 12 cu. ft., Coldspot, large freezer across top, \$75. Gardena, 644-1485. A
Cessna, 1966 Commuter, full gyro panel, 360 radio, 3-light mkr. bcn., child seat, approx. 390 hrs. total time, \$7500. Long Bch., FR 8-6951, OS 6-6138. A
Youth Bed, & mattress, \$10. P.V., FR 7-6435. A
Chevrolet, El Camino, 1959, 4-spd., r/h, newly painted & reuphol., good running cond., \$695. Hawthorne, OS 5-7938. A
Corvaire Monza, 1963, 4-spd., r/h, 3 near-new tires, \$1105 retail; \$850. La Puente, 330-3667. A
Home, 3-bdrm., full baths, bitin kitchen, forced air heat, detached gar., \$29,950. Hawthorne, 671-6187. A
Sewing Machine, Kenmore portable w/button-hole & other attachments., \$25. Redondo Bch., FR 5-8804. A
Hi-Chair, Cosco, blue plastic covered seat & back, chrome tray & legs, \$7. Rolling Hills Ests., FR 5-9689. A
Corvaire Monza, 1964, take over \$58 mo. pymts., \$1080 bal. Box 2302. A
Student Desk, \$20. P.V. Ests., 378-3055. A
Dinette Set, chrome, gray marbelized, ext. leaf, 4 chairs, \$35. Inglewood, PL 4-4052. A
Stenotype, w/case, stand, & 50 pads of paper, \$35. San Pedro, 833-2723. A
Coffee Table, matching end tables, white w/inlaid brass, brass legs, \$50. Torrance, 371-5916. A

Wanted to Buy
Piano, spinet console, must be good condition & very reasonable. Torrance, DA 6-5558. A
Fishing Equipment, salt water & fresh water rods, reels & tackle. Norwalk, 865-6736. B
Microphones, 2, to use w/Roberts stereo tape recorder, prefer directional type. Whittier, OX 3-4117. B
Ford Wagon, 1962 or 1963, no more than 45,000 miles, good condition, cash. Redondo Bch., 378-4654. B
Tenor Saxophone, must be in good condition. Long Bch., GA 3-1363. B
Ham Equipment, 80 thru 10 meter V.F.O., audio compressor, 2-meter converter. Culver City, VE 9-5438. B

Wanted to Buy
Vacuum Tube Voltmeter, reasonable condition & price. Fullerton, 879-1447. B
Dining Room Table, Duncan-Phyfe, drop leaf, w/chairs, mahogany, reasonable. Inglewood, 757-7824 after 10 a.m. B
Old Motorcycles, 1949-1955 Tri., B.M.W., H.D. & Vincents, also 3-wheelers. Hawthorne, 672-1576. B
Chevrolet Shop Manuals, 1963 & 1961. Manhattan Bch., 374-0158. B
Blue Chip stamp books, \$1.50 ea. L.A., 664-6564. B

For Trade
House, 2-bdrm., 4 bks. to Norair, will consider trade \$10,000 equity for free & clear 12' wide mobile home. Hawthorne, OS 9-6982. E

Rentals Offered
Lady to share home, \$50 mo. Redondo Bch., 374-4847. E
Apt, 2-bdrm., unfurn., cpts., dps., closed gar., laundry rm., 1 block from Hermosa Bch., \$110 mo. San Pedro, 831-6789. E
Apt, 2-bdrm., cpts., dps., bltin stove, carport, water pd., \$125. Inglewood, 673-3427. E
Duplexes, 1 & 2-bdrm., furn., 1½ miles from Norair, \$97.50 & up. Inglewood, OR 1-9375. E
Apt, 1-bdrm., gar. water paid, newly redecorated, 1 child ok, avail. Dec. 1, \$75 mo. Hawthorne, 675-4267. E
Vacation Cottages, Idyllwild, 1 & 2 bdrms., fireplace, stream, patios, \$20-\$35. w/ends; \$45-\$70 wk. L.A., PL 4-5288. E
Apt, 1 extra large bdrm., cpts., dps., bltins, gar., water, trash paid, close to Northrop, \$95 mo. Hawthorne, 325-5705. E
Apt, 2-bdrm., 1½ bath, cpts. & dps., bltins, near schools & recreation, \$125 unfurn.; \$155 furn. Inglewood, 644-2565, 672-1890. E
Vacation Cabins, Lake Gregory & Crestline, \$25 w/ends; \$60 wk. Venice, EX 1-2040. E
Apt, 2-bdrm., unfurn., cpts., dps., bltins, carport, disp., forced air, laundry rm., newly painted, water & trash pd., \$110. Hawthorne, OS 9-1851. E
Apt, 1-bdrm., unfurn., all bltins, pvt. deck, lge. pool, ample sub. parking, near Northrop, \$125 mo. Lawndale, 679-2117, 670-6084. E
House, 2-bdrm., fenced yd., water & trash paid, near schools, 2-car gar., \$118 mo. Hawthorne, DA 9-9621. E
Apt, 2-bdrm., unfurn., bltins, cpts., dps., pvt. patio, closed gar., \$125 mo. Torrance, EX 5-0857, 320-7547. E
Cabin, Big Bear Lake, sleeps 7 to 9, \$18 w/nd; \$50 wk. Bellflower, TO 7-0652. E
House, Orange County, near S.D. Fwy., 3-bdrm., den, cpts., dps., family rm., bltins, dishwasher, disposal, laundry rm., \$195. Westminster, 714-531-7306. E

Child Care Offered
In my home, hot lunch, lge. fenced rear yard, encl. rumpus rm., planned activities. L.A., PL 4-2784. G

Personals
To those who expressed their sympathy in so many beautiful & thoughtful ways during my recent bereavement, I extend heartfelt thanks. MRS. DARLEEN GUNION. L
We wish to express our deep appreciation to all our friends at Nortronics; especially those of NRC, my division & my dad's division for the beautiful flowers & most welcome collection. BETH ANN & DAVID KELLEY-HOUSE. L
Sportsman Wanted, to share expenses for Mexican safari during Christmas vacation, hunt jaguar, ocelot, alligator, also fishing for marlin at Mazatlan. L.A., HO 3-5337. L
Free storage of spinet or baby grand piano in my home. Garden Grove, 714-539-2262. L
We sincerely thank all of our friends for their kindness & sympathy at the recent passing of our father. MELVINA DENCH, CLAY ENOCH jr. & CARROLL ENOCH. L
Roommate wanted, girl, 21-30 to share w/same, Anaheim area, very reasonable. Box 2304. L

For Sale or Trade
Cabin Cruiser, 27' Chris-Craft, sleeps 4, completely equipped, V-8 power, ship to shore radio, bow rail & swim step, \$5500 or trade small ski-boat. Torrance, DA 9-3900. M
Yamaha, 1964 80 cc, \$250 or trade for pickup. Hawthorne, 679-4237. M
Pontiac, Tempest, 1963, station wagon, r/h, auto. trans., luggage rack, \$895 or trade on Volkswagen, 1966. Manhattan Bch., 372-3878. M
Antique Auto, 1920 Model T Ford, center dr. sedan, fully restored incl. new authentic interior, \$2000 or trade for T-Bird, 1955 or '56. Fullerton, LA 5-9715. M
Home, 5-bdrm., 2½ bath, Spanish style w/paneled bar & den, lge. open beam living rm., covered patio, basement, plus 10 furn. units, 5 2-bdrm. & 5 1-bdrm., has \$77,000 1st T.D., owner will carry 2nd, \$152,000 or trade for property in West L.A. Hollywood, HO 4-1084. M
Train Set, Lionel O gauge, locomotive, cars, track & log loader, \$25 or trade for HO train set. P.V. Pen., 377-5862. M
Pontiac, 1959 Safari wagon, air cond., new tires, battery, brakes, susp. bushings & shocks, \$375 as part trade for revolver, tune-up gauges, or mechanic tools. L.A., 756-1431. M
Chevrolet, 1965 Impala SS, 396 console, b/seats, auto. trans., fac. air, p/s, p/b, 21,000 miles, \$2500 or trade for less plus \$100-\$300 old trans. car. Costa Mesa, 546-5891. M

## Rides and Riders

Rides Wanted
7 a.m. — 3:42 p.m.
Avalon & Vernon, Los Angeles. Edwin L. Durham, Norair, ext. 2236, 231-0855.
El Segundo Blvd. & Doty, Hawthorne. Estelle Borger, Nor. Anaheim, ext. 415, 676-8965.
7:30 a.m. — 4:12 p.m.
Manchester & Vermont, Los Angeles. John Curtis, Norair, ext. 1581.
8 a.m. — 4:45 p.m.
Magnolia & Cerritos, Anaheim. Leslie Allen, Norair, ext. 2412, 714-828-2012.
Commonwealth & Lemon, Fullerton. Penny Branch, 879-2524.
Leutweiler & Leffingwell Rd., Whittier. Ernest J. Keraly, Norair, ext. 2563, 944-5946.
Lakewood Blvd. & Imperial Hwy., Downey. Morris Brown, Norair, ext. 2042, TO 1-8508.
Rides Offered
8 a.m. — 4:45 p.m.
Magnolia & Cerritos, Anaheim. Leslie Allen, Norair, ext. 2412, 714-828-2012.
Commonwealth & Lemon, Fullerton. Penny Branch, 879-2524.
Lakewood Blvd. & Imperial Hwy., Downey. Morris Brown, Norair, ext. 2042, TO 1-8508.
Leutweiler & Leffingwell Rd., Whittier. Ernest J. Keraly, Norair, ext. 2563, 944-5946.

## NRC To Launch Eight-Week Investment Seminar

Hawthorne area NRC Councils are formulating plans for an investment seminar in the spring covering the broad field of investments.

Last spring 150 persons attended an eight-week seminar sponsored by NRC which covered only real estate investments.

These individuals, and others, have asked NRC to expand the program, to include other investment possibilities.

Just how far the program will go and what it will cover will be left up to the individuals who wish to participate, according to Personnel Activities.

Some of the topics under consideration are planning and guidance, stocks (analyses), mutual funds, commodities, real estate, estate planning, taxes, small businesses, money (system and market), world and national influence, and investment consultants.

Outstanding speakers and experts in selected fields will be scheduled to appear at the seminar. Sessions will be held once each week for eight or ten weeks, probably immediately after work shifts, at NRC Clubhouse, Hawthorne. Costs will be held to a minimum.

Interested individuals are invited to express their preference in person or by note to Personnel Activities at Norair, Organization 1230, Zone 5. State the topics or subjects desired and give your name and plant address for reference. Your comments will not constitute a signup for the course, but serve merely as an indication of interest.

## Perpetual Trophy Back With Norair

Northrop Norair golfers representing Antelope Valley facilities went one up on their friends from North American Rocketdyne November 6 by winning their semi-annual golf tournament and regaining possession of a perpetual trophy.

Norair has now won the trophy four times in seven outings.

The event, which drew 15 participants from each firm, was held at the Golden Hills Country Club, Tehachapi.

Doug Cadle of Norair's Palmdale facility won the low net honors for the day, while Loren Cole of the Edwards AFB facility made it a clean sweep by winning low gross honors.



## Education Refund Plan Has A Banner Academic Year With Fifteen Graduates

This has been a banner academic year for Nortronics West Coast personnel. Over 100 have taken advantage of Northrop's liberal Education Refund Plan with 15 earning degrees during the period.

Among the 15 degree winners were 10 who earned advanced degrees.

Seven individuals earned degrees at the conclusion of the fall semester, seven at the end of the spring semester, and one during the summer session.

Hal Janssen, chief of Compensation and Training for Nortronics West Coast operations, points out Nortronics management is particularly proud to have assisted these individuals in achieving their educational goals.

"The Education Refund Plan, which allows up to 100 percent reimbursement for course work related to the individual's job, is one of the broadest and most liberal employee education benefit programs in our industry," Janssen said. "However, the personal effort and sacrifices expended by the participants are the significant ingredients that bring meaningful value to the program."

### List of Graduates

The 1965-66 year graduates were:

Gordon Austerman, an engineer in the Munitions Development group, who received a B.S. degree in mechanical engineering from California State College in Long Beach. Gordon joined Nortronics in July 1964 and received his first Education Refund a year later. He is currently working toward an advanced degree at Cal State, Long Beach.

Bror Dahlberg, supervisor of Material Proposals and Advanced Planning, received an M.S. in quantitative analysis from USC. Bror joined Nortronics in August 1962 and has been an active participant in the Education Refund Plan since 1963.

Neale Ebright, a special assistant in Engineering Services at Hawthorne, was awarded a B.S. in business administration from USC. A Northrop employee since July of 1947, Neale began his studies under the refund plan in the spring of 1964. He is presently working toward a master's degree in business administration at USC.

Harold Gerson, a senior engineer in Environmental Engineering at Hawthorne, received an

M.S. degree in electrical engineering from USC. Harold joined Northrop in April 1958 and received his first refund in March 1964.

Aaron J. Goldstein, a Hawthorne senior engineer in Circuit Development, was awarded an M.S. in electrical engineering by USC. Aaron's first refund was made in April 1963. He joined Northrop in June 1962.

John A. Gunderson, a senior engineer in Intelligence Handling Data at Anaheim, also earned an M.S. degree in electrical engineering at USC. John's first application for an education refund was filed in the fall of 1964.

Lee Roy W. Hausman, jr., who recently became supervisor of Intelligence Data Handling at Anaheim, received a master's in business administration from UCLA. An active participant in the refund program since the spring of 1963, Lee also received Graduate Study Awards in 1964 and 1965 which allowed him to attend school during the day to attain his advanced degree goals.

### In C-5 Measurement

Edward F. Hebda, a senior engineer in the C-5 Inertial Measurement unit at Hawthorne, earned an M.S. degree in electrical engineering at USC. Ed joined Northrop in January 1961 and in July of the same year received his first refund. He received a Graduate Study Award in 1965 which led to his recent degree.

Peter G. Katzaroff, jr., an engineer in Systems Support Equipment at Hawthorne, received a B.S. in electrical engineering from UCLA. Employed by Northrop since June 1959, Peter has been active in the education refund program since 1960.

Charles Lotterman, a Systems Test senior engineer at Hawthorne, earned an M.S. in electrical engineering from USC. He has been with Northrop since May 1960 and began his training under the refund program in 1964.

Kevin J. McAloon, an engineer in Advanced Systems Engineering at Hawthorne, was awarded an M.S. degree in electrical engineering by USC. Kevin began working toward his advanced degree shortly after joining Nortronics in December 1962. He received a Graduate Study Award in 1965.

Donald J. Murray earned an M.S. in electrical engineering

from USC. He was recently promoted to senior engineer in Tracker and Control Development at Hawthorne. Don has worked with Northrop since January 1965 and is currently enrolled in further studies at UCLA.

### Industrial Management

Charles E. Pollard earned an MBA in industrial management from USC. He currently serves as a project planning analyst at Anaheim and has taken part in the refund program during the summer school sessions.

Clinton M. Tompkins, Applications Engineering district representative, earned a B.A. in business administration at USC. Clinton has been with Northrop since November 1956.

Robert Van Alstine, a senior engineer in Inertial Components and Electronics at Hawthorne, earned an M.S. degree in mechanical engineering from USC. He has been active in the refund program since the fall semester of 1962.

"Commensurate with expansions of facilities and personnel, enrollments in the Education Refund Plan have risen sharply," Janssen said, "and the 1966-67 academic year promises to be significantly rewarding in terms of scholastic achievement."

### West Coast Employees Get Four-Day Weekend

Northrop Corporation West Coast employees will enjoy a four-day weekend holiday in observance of Thanksgiving.

The holiday will begin with the close of shift on November 23 and work will resume with the beginning of business on Monday, November 28.

### Nortronics Forms Speakers' Bureau To Help Community

A speakers' bureau is being formed at Northrop Nortronics to meet the requests for lecturers by youth groups, service clubs and other civic groups.

Earl Parker, Nortronics Public Relations manager, said his department is compiling a list of personnel interested in speaking to the various groups.

Further information may be obtained by contacting Public Relations, ext. 236, Palos Verdes.



DISTINGUISHED VISITOR to Nortronics was Lt. General Leighton I. Davis, deputy commander, Air Force Systems Command, Global Range (at left), who is being briefed by Bob Rodgers (right), applications engineer. General Davis made an informal visit to this area of Nortronics as part of a tour to learn more about applications of Northrop hardware. Don Eakin, senior engineer, is operating the mount.

## ELECTRONICS

(Continued from page 1)

participation in the 747 program is expected to be in excess of one-half billion dollars."

The vice president said the sales and backlog figures in space operations—\$25 million and \$16 million—are diversified in the HL-10 and M2-F2 lifting bodies, the Mariner Mars '69 program, the OV2-5 satellite, and research and development in physical and life sciences.

"The communications industry will be doing business at an estimated rate of \$60 billion a year by 1977, and Northrop is in the middle of this product area."

### May Pass Transportation

"According to the Stanford Research Institute," Mr. Miller said, "the communications field may pass transportation in dollar volume in 10 years. Northrop has a backlog of \$70 million in communications, as well as current sales of \$50 million."

"Weaponry is an emerging new product area. Our sales are \$21 million, compared to \$4.5 million, just five years ago. The backlog amount is \$46 million."

Product areas in weaponry include airborne countermeasure systems, the Hawk systems and loaders, ordnance and warhead devices.

### Some Company Firsts

"A valuable addition in this field," Miller said, "is Northrop Carolina, which is working on the nation's first controllable solid propellant rocket motors."

He also discussed product capabilities of each Nortronics facility, and pointed out that Nortronics "continues to be first in the nation in the field of astroinertial navigation systems."

## GEMINI 12

(Continued from page 1)

on the agenda for the U.S. manned space program. Two unmanned suborbital flights have been made so far in the Apollo program with the first manned flight planned for early next year.

When Navy Captain Lovell and Air Force Major Aldrin splashed into the Atlantic on November 15, they extended America's total time in space to 1994 hours, 14 minutes, 53 seconds. Astronaut Lovell has spent more time in space than any other man in the world—a total of 425 hours, 8 minutes and 58 seconds.

The U.S. has sent 26 astronauts aloft (19 different men; seven made two flights) in its 16 missions. The Soviet Union has orbited 11 cosmonauts in its eight successful manned flights.

Just as the weight of spacecraft has risen, so has Ventura Division responsibilities in providing the landing systems.

## UNITS

(Continued from page 1)

ply the complete Doppler radar subsystem.

An important part of Northrop's team on this program is Nortronics Precision Products Department, Norwood, Massachusetts, which is designing and manufacturing precision gas bearing, integrating rate gyroscopes.

In addition to developing, testing and producing the C-5 inertial-Doppler navigation system, Nortronics is also the contractor for integration of this equipment into the aircraft's guidance subsystem, which will include a multi-mode radar, station-keeping equipment and other navigational aids made by other companies.



Gordon Austerman

Bror Dahlberg

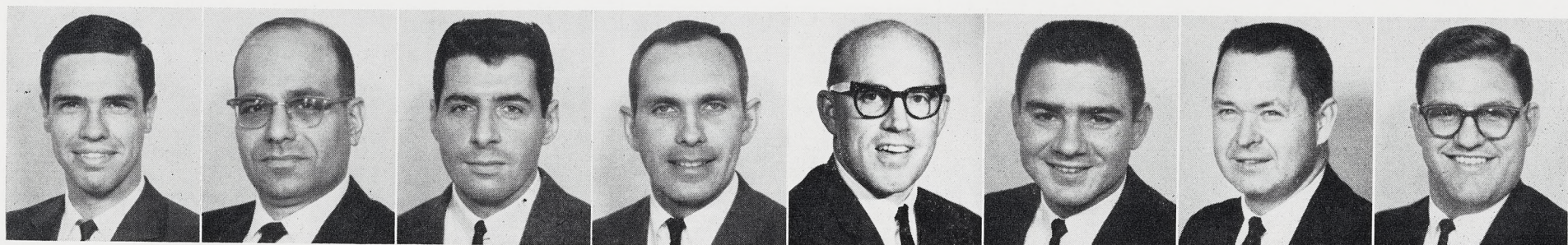
Neale Ebright

Harold Gerson

Aaron Goldstein

John Gunderson

Lee Hausman, jr.



Edward Hebda

Charles Lotterman

Kevin McAloon

Donald Murray

Charles Pollard

Peter Katzaroff

Clinton Tompkins

Robert Van Alstine



# NORTHROP NEWS

NORTHROP NORTRONICS

Published biweekly by Northrop Corporation, Beverly Hills, California

Vol. 24, No. 24

December 7, 1966

## Navy Officials See Products At Anaheim

Two key officials of the Naval Ordnance Systems Command, Special Projects Office (SPO), Captains P. L. Lacy jr. and Joseph Williams jr., were Nortronics Anaheim visitors last month.

Captain Williams is the new deputy director of SPO, relieving Captain Lacy who will soon don the stars of a Rear Admiral and assume duties as Commander of the Naval Support Activity at Da Nang, Vietnam.

The Special Projects Office is responsible for administering all aspects of the Fleet Ballistic Missile Weapon System Programs.

Nortronics works closely with the SPO as both a prime and subcontractor.

Services include the operation of the Polaris Support Depot at Anaheim, the design and production of automatic checkout equipment, the repair and refurbishing of this equipment, the operation of a tape center, specialized training efforts, select systems engineering tasks and extensive logistics support effort.

Nortronics has been a participant in the Polaris program since its inception and has been selected for a key role in the new Poseidon weapon system program.

Lieutenant Norman Culver is the SPO technical representative at Nortronics Anaheim.

Captain Williams' visit helped acquaint him with all aspects of Nortronics' participation in these programs.

Captain Williams entered the Navy 26 years ago as an enlisted man and was commissioned four years later. His duties have included service aboard rocket launching vessels, surface ships and, since 1949, in submarines. He served first in diesel-powered submarines, then shifted to nuclear-powered underwater vessels. He has served as commanding officer of the USS Robert E. Lee Gold and the USS George Bancroft Blue.



TEAMS PROJECT ENGINEERING GROUP shown discussing logic circuit, helped company develop units such as are being installed in the USS Knox, a new class of escort ship for the Navy. (L. to R.) Charles Dempsey, lead engineer, electrical; Bob Benedict, senior designer; Martin

Gregor, lead engineer, mechanical; Jay Flynt, project coordinator, and Hal Withee, project engineer for the Tactical Evaluation and Monitoring System.

## U.S. Launches First Ship With TEAMS

The USS Knox, lead ship of a new class of escort ship, especially designed for locating and destroying enemy submarines, has been launched at the Todd Shipyards in Seattle. The USS Knox has many traits of the swift and deadly destroyer, and one of the prime maintenance monitoring devices on the ship is Nortronics' TEAMS. The Knox is the first of 26 Navy ships to be equipped with TEAMS (Tactical Evaluation and Monitoring System).

Ships of the Knox class can operate as a unit of a Hunter-Killer group, screen amphibious or under way replenishment forces, patrol coastal waters for missile firing submarines (continental defense) or escort military convoys. Like the destroyer, the escort ship is very capable on missions of search, patrol, rescue, evacuation, blockade, visit - and - search or surveillance.

Harold L. Withee, Nortronics project engineer on the TEAMS program, said that when TEAMS is installed on the Knox and others for the Navy, these ships will have the first-of-a-kind integrated maintenance systems. TEAMS maintains and isolates malfunctions and out-of-tolerance conditions in important communications and surveillance devices such as the AN/SPS 40 Radar, the AN/SPS 10 Radar, the AN/SPG 53 Radar and AN/SQS 26 Sonar.

This is the first time that a continuous performance monitor will be employed on multiple systems by the Navy. TEAMS immediately pinpoints specific malfunction areas so that corrective action can be taken fast. In TEAMS, the entire logic section is solid state and micro-miniaturized.

TEAMS also monitors itself. In a sense, it takes its own pulse. It reads the count of its integrated tape memory. Since it performs specific sub routines from taped instructions, it can count these instructions so that any malfunctions will show up immediately on the counter.

Intensive reliability tests have  
(See TEAMS, page 6)

## Commander Buckbee Retires From Navy

Commander William D. Buckbee, a veteran of more than 29 years of U.S. Navy service, retired November 30.

Commander Buckbee has served for more than a year as chief of the Defense Contract Administration Services Office at Nortronics Anaheim.

Ceremonies marking his retirement were held at Nortronics Anaheim.

At that time Commander Harry Thompson, chief of the Defense Contract Administration Services District—Anaheim, assumed responsibilities for Commander Buckbee's former duties—the administration of all government contracts held by Northrop Nortronics. Commander Thompson will carry out this assignment in addition to his present duties.

(See BUCKBEE, page 6)

## Page Employees Quick to Volunteer After Vietnam Thanksgiving Tragedy

Page Communications Engineers, Inc. suffered its first Vietnam casualties in a Thanksgiving Day ambush by Viet Cong near the city of Dalat. Eight Page employees were killed and three wounded.

When news of the disaster was told to Page employees, within a few hours no less than 15 people volunteered to go to Dalat to take the place of the casualties.

"It was a spontaneous demonstration of the extreme devotion our people have to our job in Vietnam," Bob Willson, Industrial Relations director of Page Communications, said.

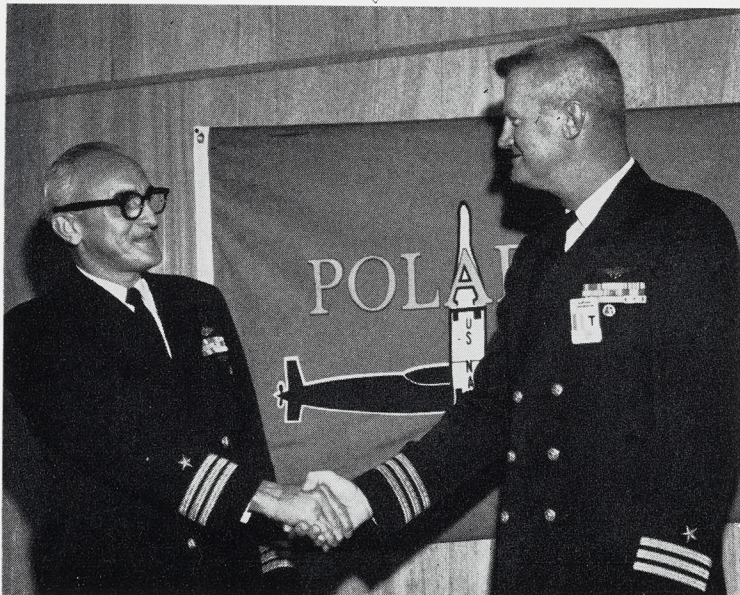
## Friend's Referral Gets Linda Salkin Guest Spot On National TV

Linda Salkin, Nortronics Industrial Relations, Anaheim, is the proud owner of a set of World Encyclopedias thanks to a guest appearance on CBS-TV, November 14. Mrs. Salkin made her TV debut as a guest on "Password," with comedian Ray Bolger as her partner.

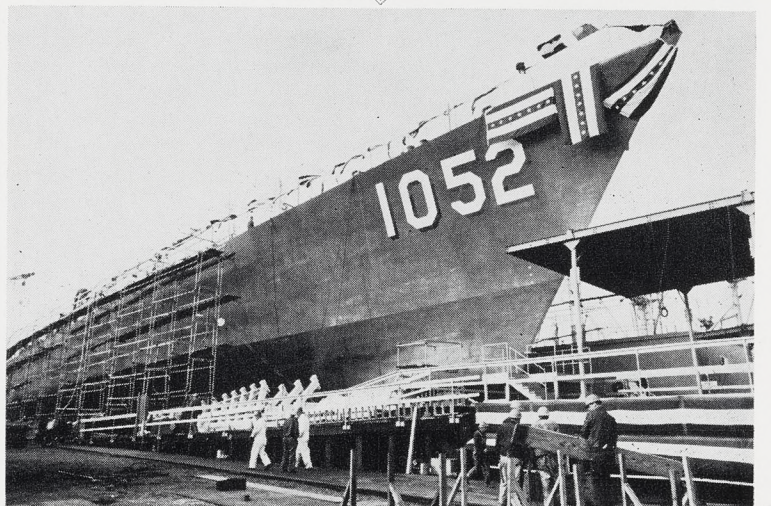
Asked how she was selected for the program, Mrs. Salkin replied, "Referral—a friend of mine who appeared on the program suggested my name. Referrals work wonders, both in helping us find needed people for Nortronics and in making appearances on national TV programs."

## Dividend Declared

The board of directors of Northrop has declared a quarterly dividend of 25 cents per share, payable December 17 to stock of record December 2.

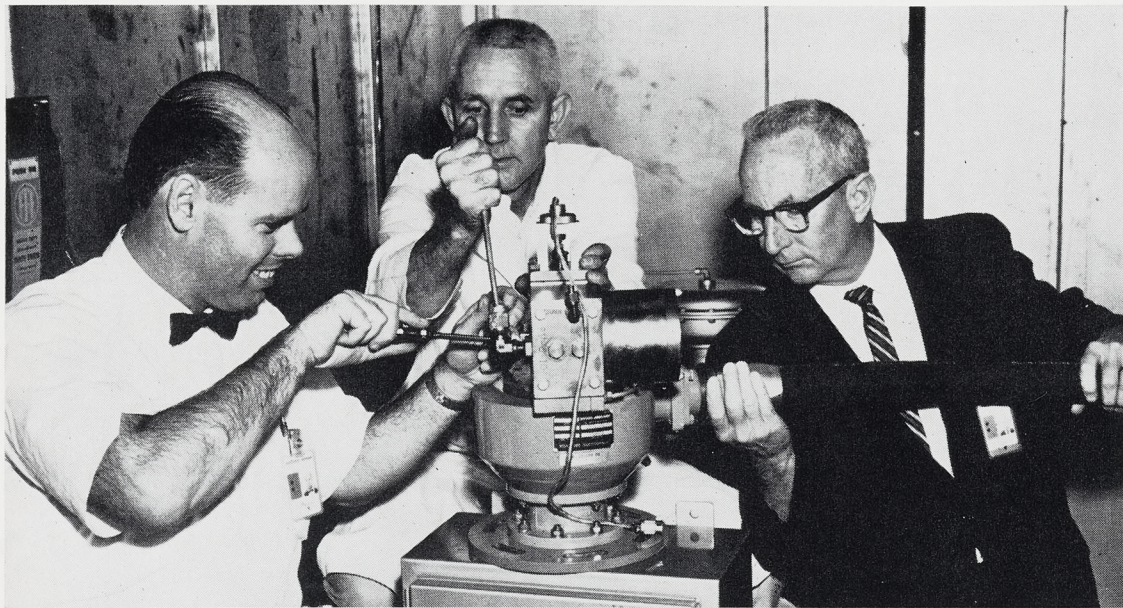


SMOOTH SAILING, BILL, could be the words Commander Harry Thompson, USN, (right), chief of the Defense Contract Administration Services District, Anaheim, used here in congratulating Commander William D. Buckbee, USN, on his retirement from active duty. Commander Buckbee has served in U.S. Navy for more than 29 years and the past year as chief of the Defense Contract Administration Services Office at Nortronics Anaheim.



FIRST OF A NEW CLASS of escort ship, the USS Knox has been launched at the Todd Shipyards in Seattle. The Knox is first of 26 Navy ships to be equipped with Nortronics TEAMS, which is to be one of the important monitoring devices necessary to give personnel a constant check on surveillance equipment aboard the new escort ship.





NEW POTENTIAL MARKETS are forecast for the Noraircoustic generator. Necessary adjustments on the Mark V, 50,000 acoustic watt model are being made by (L. to R.) Don C. Skilling, acoustic specialist; Harold Spivey, acoustic technician and Royal Jackman, chief of Engineering Labora-

tories. A larger unit, also offered for sale is called the Mark VII, which is rated at 200,000 acoustic watts. These units, when coupled in a multiple system, are capable of producing more controlled sound power than anything else known in the field today.

## Forecast An Expanded Market for Two Noraircoustic Noise Generator Models

"There is an expanded market for noise," says Ned Garlock, director of Major Subcontract Marketing at Norair Division. But he hastens to add, "controlled noise that can be adapted to testing and present aerospace programs. There is an increasing need to simulate the very high noise environment which aerospace products must withstand."

Some time ago, the Northrop News carried a story about the biggest controlled noise source in the world, the Noraircoustic generator, produced by Northrop for use at North American Aviation.

The device being used by North American can develop 400,000 acoustic watts. It is designed to test the effects of noise on operating personnel and critical electronic systems of the Apollo Lunar Orbital spacecraft when it is launched by the seven and one-half million pound thrust Saturn V booster.

### Two Basic Sizes

The Noraircoustic generators are produced and marketed in two basic sizes. One is the MK V, rated at 50,000 acoustic watts. The other is the Mark VII rated at 200,000 acoustic watts. An acoustic watt can be heard when you turn your Hi-Fi up to the fullest, enough to drive you out of the house; that's one watt. Units can be combined in a multiple system as in the case of the North American Aviation installation, to provide greater over-all sound power.

The generators are high pressure (over 100 pounds per square inch) air modulators which can

produce band random or discrete sound energy (controlled noise). Spectrum shaping, in the form of adjustment of the high frequency or low frequency roll-off rates (terms familiar to Hi-Fi fans) and control of the frequency of maximum energy can be obtained within limits. Both models are driven by electrohydraulic actuators. To obtain rated output, the MK VII generator requires an air flow of 4500 SCFM at 120 psig, hydraulic flow of 30 GPM at 2500 psi and 100 watts of electrical control power.

### Don Skilling, Inventor

The generators were developed and are produced in the Engineering Laboratories, Royal Jackman, chief. The inventor of the Noraircoustic generator is Don C. Skilling, Acoustic Engineering specialist. Mr. Jackman said that the unit originated by Mr. Skilling is "unique because it is capable of producing more controlled sound power than anything else in the field today. For instance, the unit sold to North American is capable of producing sound pressure a million times greater than the human ear can stand."

"Presently," Mr. Jackman said, "Noraircoustic generators have been sold to Lockheed in Rye Canyon, NASA Goddard Space Flight Center and Boeing, Seattle, as well as North American. The first small unit sold to Lockheed is being used for testing now and two larger units have been delivered to the Rye Canyon facility and will be installed soon."

The two Noraircoustic generators (Mark V and Mark VII) em-

ploy an electrohydraulic poppet valve actuator system which is able to convert air stream power to sound three times more efficiently than a siren system and more than 30 times as efficiently as a conventional loudspeaker system.

Several of these units in a multiple system can produce sound power up to a million watts.

Mr. Garlock said that the potential market for the Noraircoustic generator includes testing in simulated severe environments by government agencies, large companies, special testing laboratories and some universities.

Mr. Jackman pointed to another potential long range use of the generator. "Now that science is concentrating on oceanography, we have considered the use of sea water instead of air, to power the generator. This would entail design and development for the new environment but the potential for testing with undersea sound waves is as great as space, in some respects," he said.

## Hakes Named Mariner '69 Project Head

The selection of Ralph Hakes to serve as Northrop program manager for the Mariner '69 Program has been announced by Dr. V. W. Howard, Norair vice president — Northrop Space Laboratories.

Mr. Hakes, formerly deputy program manager for Mariner '69, succeeds Robert Munk.

Mr. Munk has accepted an assignment as assistant deputy director in the Tactical Warfare Programs branch, Department of Defense, at the request of Dr. John Foster, director of Research and Engineering for the Department of Defense.

Prior to his latest assignment, Mr. Hakes was chief of Norair's M2/HL-10 Project.

He is a veteran of more than 38 years in engineering work, including more than 12 years with Northrop.

Mr. Hakes directed the design for the ballistic nose release system for the SM-62 intercontinental missile. He has worked extensively with NASA organizations on orbital and entry vehicles and has managed numerous studies of satellite systems.

## Brian Fleming Wins Scholarship at USC

A Northrop Norair employee, the son of a 25-year Northrop veteran, has been named to receive a \$500 scholarship.

He is Brian Fleming of Manufacturing Control, the son of C. L. Fleming, also of Manufacturing Control.

Brian won his scholarship from the Los Angeles Chapter, National Association of Accountants "for outstanding potential in the field of accounting and scholastic achievement at USC."

## Norair Gets Contract To Study Man's Ability To Work Under Stress

A program to establish man's capabilities under flight stresses which could be encountered in the Air Force's proposed Advanced Manned Strategic Aircraft (AMSA) will get under way in the near future at Norair Division of Northrop Corporation.

The program will be under the direction of Aeronautical Systems Division's Deputy for Systems Management, Wright-Patterson AFB, Ohio. Lt. Colonel John D. Ludlow is the program director.

An Air Force contract to conduct the program was recently awarded to Norair, where a ride quality simulator has been programmed to appropriate flight characteristics of two AMSA designs now under study by ASD.

With Air Force crews as subjects, the program is expected to help establish design criteria based upon man's ability to function under unusual flight conditions.

## Amateur Radio Operators To Meet on December 12

Amateur radio operators interested in organizing a Northrop Radio Club will meet at 5 p.m. Monday, December 12, in the Northrop Recreation Club (NRC) Clubhouse, Hawthorne.

Bill Anderson of Norair, one of the men organizing the club, said the group's first activities will include classes in Morse code and radio theory. Instruction in these fields is necessary for obtaining licenses from the Federal Communications Commission (FCC).

A transmitting station will be established in the NRC Clubhouse, Mr. Anderson said. The FCC has been requested to license the station as W6VPZ, the call sign held by an earlier Northrop Radio Club.

Further information may be obtained from Mr. Anderson at Extension 1933.



GENE BOGGESS, commissioner of the NRC Symphonaires for the past three years, has been named coordinator for the annual Centinela Valley Fine Arts Association Music Festival, December 20, at Hawthorne Memorial Center. The NRC Symphonaires are planning their third appearance at this event.

## Social Security Taxes Will Be Higher in 1967

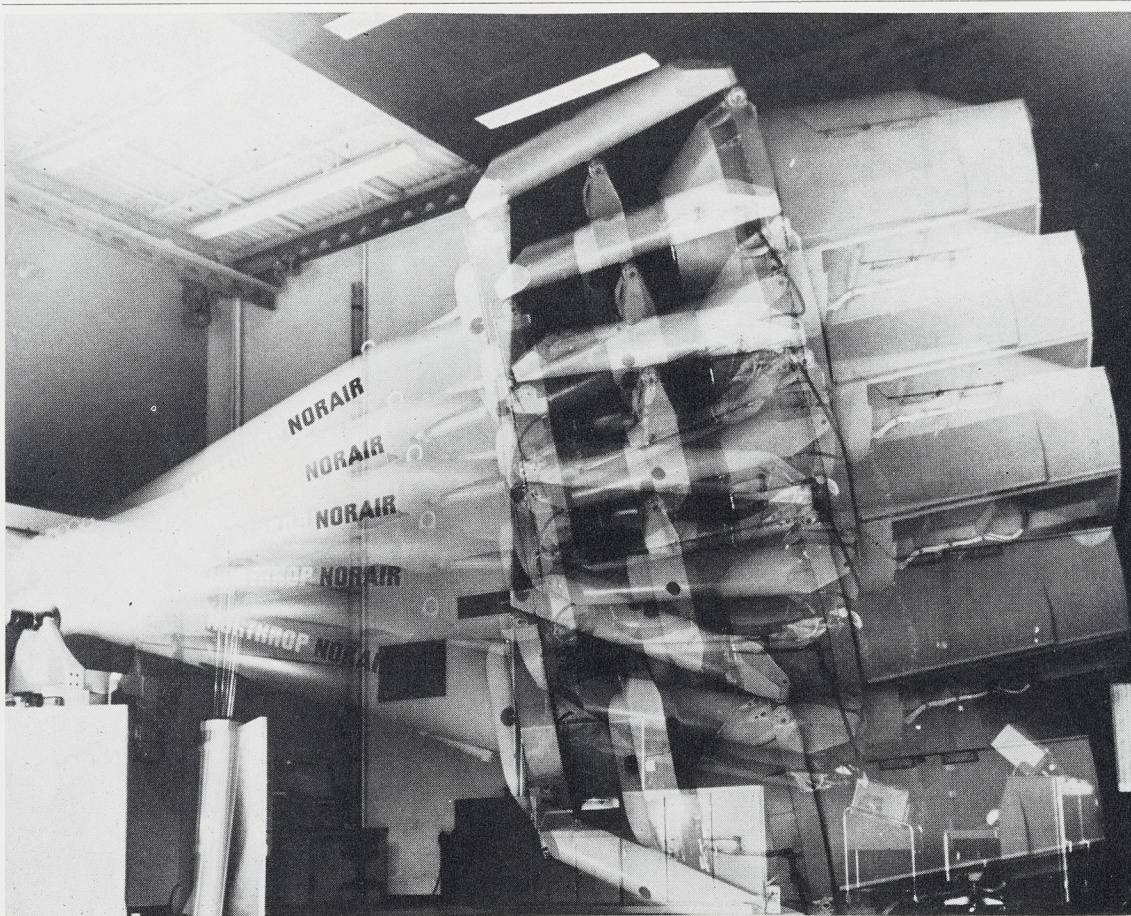
Initial paychecks covering wages Northrop Corporation personnel earn in 1967 will reflect an increase in social security taxes.

The increase was imposed by the Social Security-Medicare law passed by Congress in 1965.

The new rate is 4.4 percent of the first \$6600 in wages earned in 1967. Last year the rate was 4.2 percent of the first \$6600 earned.

Northrop Corporation will also pay a higher tax rate on behalf of each employee, matching the employee's social security contribution dollar for dollar.

To change the beneficiary of your savings bond, obtain a copy of form PD 1787 at any bank.



ROLL, PITCH, AND YAW modes of Northrop Corporation's large amplitude 3-axis flight simulator are shown in this multiple exposure photo. The large cockpit assembly is cantilevered on the end of a 24-foot beam and has a vertical translation of more than 20 feet; a lateral translation, or sideslip action, of plus or minus 4 feet; a roll capability of 45 degrees left and right; a yaw of plus or

minus 30 degrees; and a pitch of 5 degrees of freedom. Northrop claims its simulator is capable of reproducing the dynamic responses of any known aircraft with unmatched accuracy and can be programmed to provide precision motion cues in the dynamic frequency range of maximum interest for aircraft not yet manufactured, such as SST and hypersonic vehicles. Photo by Bill Cox.





MINUTE PRECISION is required as Tom Griffith of the Nortronics Hawthorne Optics Laboratory prepares a convex grinding tool for receiving a 30-inch mirror. (See photo at right.)



A SPINNING MIRROR, 30 inches in diameter, is carefully watched by Tom Griffith of Nortronics Hawthorne. Optical equipment is only one of the product lines of the labora-

tory. Others include prisms, optically flat windows, and components for condensing systems. The laboratory is in Norair's Plant Two.

## NO OPTICAL ILLUSION

# Telescopes, Prisms Keep Lab Busy

Photos by Bill Cox

Located within the walls of Plant Two in Northrop Corporation's Hawthorne complex is a unique Optical Development and Fabrication Laboratory.

Personnel working within this facility represent more than 100 years experience in precision optics. Optical components and systems, large and small, have been and are being built. Most optics are fabricated to accuracies within a very few millionths of an inch.

"These," explains Paul Halderman, who is in charge of the lab, "are so accurate that they must be measured by interference of light, rather than by physical means."

Another important part of the capability is that of thin film vacuum depositions, including complex sequential coding.

Products include various sorts of lenses, telescopes, prisms, ground and polished to within one to two arc-seconds, and optically flat windows.

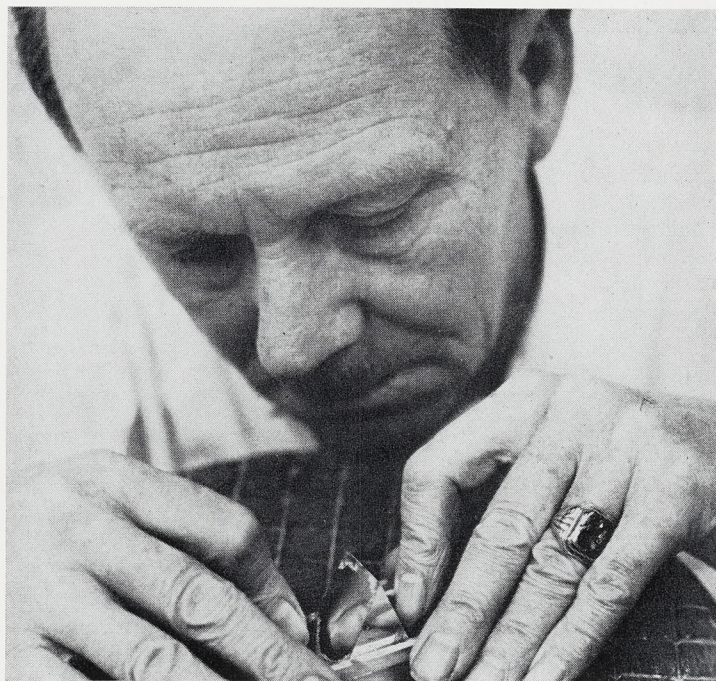
Spectrometers, microscopes, lens grinding and polishing machines, interferometers—and even such exotic-sounding names as Askania collimators, ellipsometers, a Tolansky gauge and a vacuum-

coating system. All are commonly used by the laboratory.

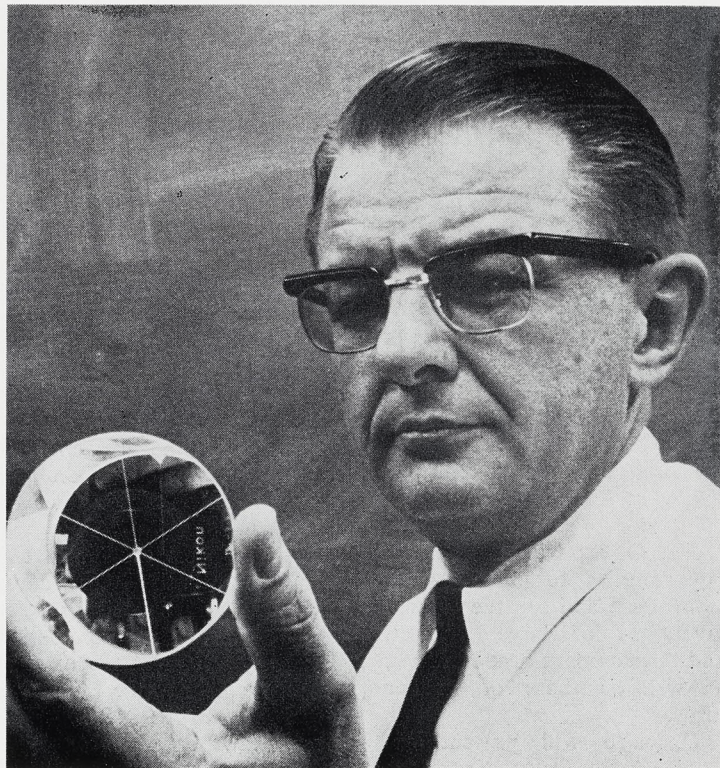
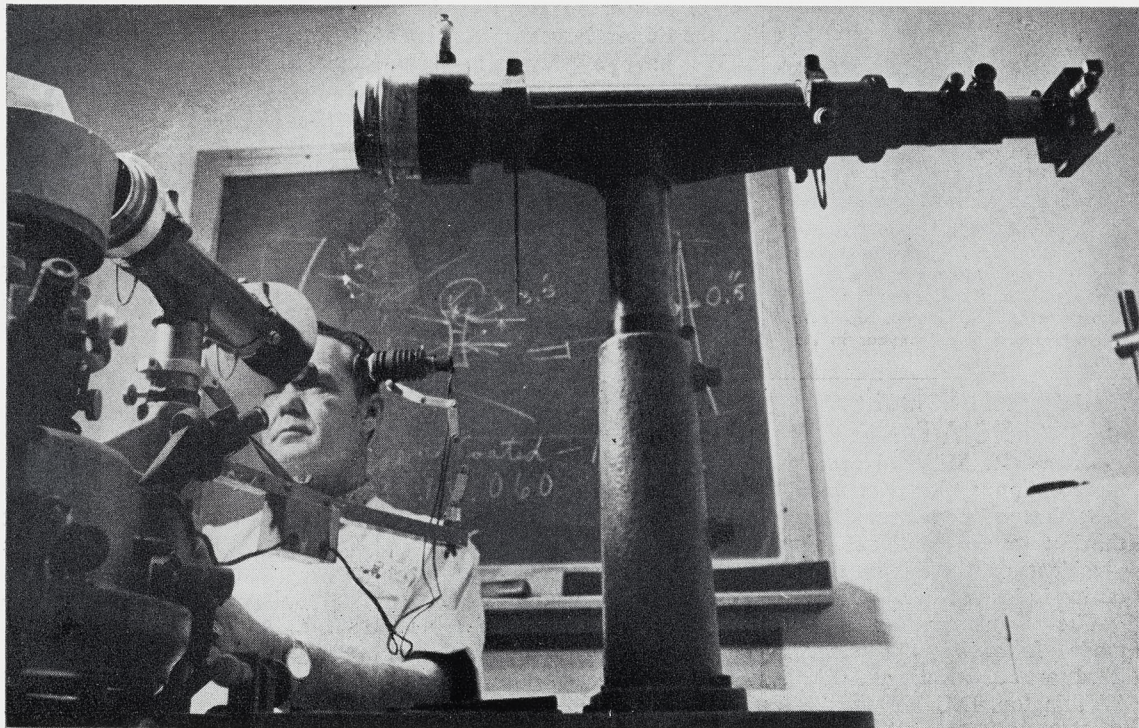
Much of the laboratory's equipment was built at Northrop for use in furthering research and development.



LENS GRINDING is, of course, a primary function in an optical laboratory, and here, from left, Frank Stetson, John Bartos and M. E. Therssen work on grinding equipment. Much of the lab's equipment was developed and built there. Below, Mr. Stetson tests a lens for accuracy through use of a spectrometer.



OPTICAL PRISMS, used in inertial platform systems and similar programs, need to be as near perfect as is possible. Above, M. E. Therssen hand-polishes a prism. Nortronics builds prisms to within 1 or 2 arc-seconds of a degree of accuracy. Below, Paul Halderman holds a six-faceted optical device which automatically centers a camera lens, even when the camera is moved. This is all-important in tracking and sighting systems.







**ELECTRONS AT WORK**—George Blake, research analyst, watches as Jean Donner prepares to cut small specimen from resistor wire. Behind them is electron microscope capable of magnifying specimen as much as six million times and performing crystallographical and spectrochemical analysis. For view of specimen cut see the accompanying picture.



**DARKROOM VIEWING** — Engineering Specialist Robert Herfert uses light table to view transparency made from negative exposed during electron microscope operation. Microscope is key tool in Norair's extensive materials research capability, was enhanced recently with addition of a new electron probe microanalyzer. Photos by Dave Saldana.



**INSIDE THE WIRE**—Specimen just .030 inches in diameter shown being cut in accompanying photograph looks like this when magnified 12,000 times by Norair's electron microscope. Dimples indicate possible ductile overload; impurities appear as crater-like indentions.

## FIRST OF ITS KIND

# Materials Research Adds Electron Probe Microanalyzer

Northrop Norair's extensive materials research capability was enhanced still further recently through the installation of an unusual addition to an existing system.

The addition is an electron probe microanalyzer. It was installed to complement present electron microscope capabilities.

The new unit is the first of its design in use in the United States and one of the few known in the world.

It will analyze, both crystallographically and spectrochemically, an identical area on the surface of a solid in a matter of a few minutes through a series of simple and orderly operations.

This complete research system,

comprised of the electron probe microanalyzer installed on an electron microscope, is actually several units combined into one.

It is an optical microscope. It is also an electron optics system used to focus an electron beam on a specified area. Electrons impinging on the sample generate secondary characteristic X-ray spectra of the elements present. The system is also an X-ray optics unit analyzing the X-rays emitted by the sample according to their wavelengths and intensity. It probes into the realm of molecules and atoms and allows visual study of the chemical units from which all matter is built.

Norair refers to the system as an Electron Microscopy Labora-

tory. It is operated by the Materials Research group's Metallurgy Research branch.

Obviously, the system's magnification factor alone is important in that it makes available for direct observation and study many previously unseen objects. The electron microscope itself is capable of magnifying from 400 to 6,000,000 times. The electron microprobe will examine an area one micron (that's .000393 inch) in diameter on the surface of a solid sample.

Norair utilizes this capability in a number of ways.

Applied research in materials is the single most important task delegated to the system. It serves Norair's extensive research and

development efforts in the field of titanium metallurgy, in processing, forming and joining these alloys into components and parts.

It is used to study the basic parameters associated with the mechanical behaviour of materials.

It will continue to be used in analyzing specimens from possible faulty or damaged aircraft and spacecraft components.

These samples, coupled with available knowledge, help skilled researchers determine what has happened, when it happened, and in most cases, why it happened.

This study is called electron fractography.

Information obtained is utilized in making decisions calling for redesign of the components, changes

in production techniques, or substitution of other materials for those used.

In addition, the expanded system will make it possible to seek additional study contracts for outside interests. At present more than 35 percent of the system's effort is devoted to such contracts.

"We are somewhat limited by the configuration of the specimens we study. But if we can see them, we can work with them," said Robert Herfert, Engineering specialist who heads the microscopy activity.

"We are particularly interested in working closer with other Northrop divisions to help solve their research problems in areas where this system may be employed," Mr. Herfert added.

## John Oliver Will Be on Educational Television on Thursday, December 8

Northrop Corporation's administrator of Product Licensing, John E. Oliver, will be a guest this week on "R&D Review," an educational television series on KCET (Channel 28).



John E. Oliver

Mr. Oliver will appear with Dr. Martin Klein, the show's moderator, at 9:30 p.m., tomorrow. The hour-long show will be repeated at 8:30 p.m., Saturday.

Their topic will be: "Licensing: Small Business Taps Big Research and Development."

Mr. Oliver will explain the opportunities for businessmen to produce and sell the unused inventions of large research and development organizations, as well as those of smaller firms.

He also will present ex-

amples of successful projects in that field and explain procedures for obtaining licenses.

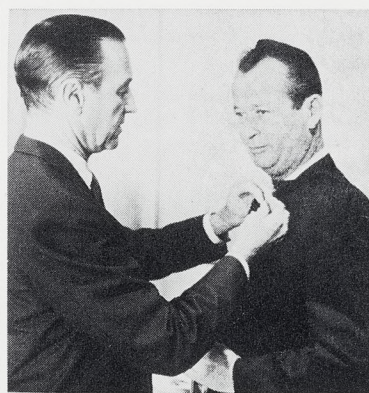
Other titles, and their show times, are:

"Navy's Research Submarines," 9:30 p.m., December 15 and 8:30 p.m., December 17; "NASA Patents and Procedures," 9:30 p.m., December 22; and "Fluidics," 9:30 p.m., December 29 and 8:30 p.m., December 31.

## Retirement Club To Elect Officers

Members of the recently formed Northrop Retirement Club will meet at noon on December 14 to elect officers for 1967.

Outgoing president Norbert A. Lorentz said the Nominating Committee will submit its selection of officers, but nominations also will be open at the meeting, to be held in the Northrop Recreation Club (NRC) clubhouse, Hawthorne.



F. W. (Bob) Lloyd, Northrop vice president and Norair general manager, (right) grins as Thomas V. Jones, Northrop president and chairman, pins 25-year service pin on his lapel. Mr. Lloyd finished his 25th year in November.

## Miller Earns Selection To Third NSIA Term

Robert R. Miller, Northrop Corporation senior vice president, has been re-elected to a third term as national vice president of the National Security Industrial Association.

The announcement was made following the NSIA's 23rd annual meeting, held in Washington, D.C.

## Letters to The Editor

From time to time, the Northrop News will publish letters from Northrop people which are of general interest. However, because of space limitations, publication cannot be guaranteed.

To the Editor, Northrop News:

We have a very nice newspaper. Lots of plane talk and plain talk.

I think it's time for a little FUN talk.

There must be loads of funny incidents that happen throughout this large company. Employees would submit funny incidents and the most humorous in a certain period would get a prize. Maybe 5 cents for an F-5 joke, 38 cents for a T-38 and 53 cents if it involved just anything. The contributor can also remain anonymous, if he so wishes. A good laugh never hurt anyone.

Mrs. R. S. Solomon  
Organization 3430

Editor's Note: A good idea. And we'll go one up on prizes. The Northrop News will provide an on-the-job "8x10" picture of any employee with an accepted humorous story.

To the Editor, Northrop News:

Prior to my joining Nortronics, I was very safety conscious. I can say I am even more so now, as a Northrop retiree.

I am happy to note that a recent issue of the Northrop News stressed safety and gave it top priority, even more so than previously.

Please don't take my remarks wrong. We employees, responsible for safety, in our areas, did our best.

In 1957-58, I was given a plaque, which occupies a place of honor in my living room. I highly cherish this plaque. It reads:

Achievement Award to  
George L. Basher—2171  
For the most outstanding  
contribution to safety  
1957-1958

T. H. Quayle, Manager

I want to thank everyone at Northrop who helped obtain this award. Through the Northrop News, I extend a cordial invitation to anyone coming east, to vacation with my wife and self.

George A. Basher, Route 1  
Titusville, Pennsylvania



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170. zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

**For Sale**  
**Hilltop Lot**, Paradise Valley, Yucca Valley, purchased for retirement home, golf course, country club estate, \$5000. L.A., 670-2604. A  
**Dishwasher**, 1965 GE Mobilemaid, portable, used less than 11 mos., \$115. Torrance, 326-6195. A  
**Lawn Edger**, McLain, gas-powered, \$30. Los Alamitos, GE 1-0843. A  
**Golf Clubs**, 1 set, & bag, \$60. Hawthorne, 679-5436. A  
**Muffler**, for MGB, never used, \$10. Hawthorne, 676-9993. A  
**Floor Washer**, Regina, all brushes incld., \$30. Gardena, 329-9484. A  
**Airplane**, Ryan PT-22, 480 hrs. on Kinner R-56 since new, new prop, spinner, tires, & rear glass, Skycrafter superphone, parachutes, helmets, spare parts, \$3500. Redondo Bch., 378-4654, 378-7869. A  
**Banjo**, 5-string, long neck, \$150. Fullerton, LA 5-9715. A  
**Pups**, miniature dachshund, AKC champ. stock, 2 black males, 1 red female, males, \$60; female, \$70. Torrance, DA 5-7806. A  
**Executive Desk**, 3'x6', solid walnut w/glass top, \$225. Anaheim, 776-1322. A  
**AFB & Manifold**, for 1955 to '61 Ford 272-292-312 engines, \$20. Norco, 737-1081. A  
**Pickup**, 1/2-ton Chevrolet, 1965, low mileage w/Pilgrim walk-in camper, \$1950. Gardena, DA 4-7623. A  
**Lot**, lge., level, all improvements in, 75x150, low down, \$17,950. P.V. Pen., FR 7-4943. A  
**Oil Cleaner**, Frantz, for car, truck or boat, 1-yr. guarantee, 1-yr. supply filter cartridges, \$29.95. Torrance, 371-3620. A  
**Piano**, upright, \$125. L.A., GR 4-7895. A  
**Weightlifting set**, 110 lb., complete vinyl coated, \$15. Yorba Linda, 528-9227. A  
**Lot**, lge. level, corner, Paseo del Mar, Lunada Bay, unobstructed view, underground uti., \$1000 dn. or more at option of buyer, will carry bal. at 6%, \$21,000. Rolling Hills Estds., 377-0146. A  
**House**, 3-bdrm., 1 3/4 baths, covered patio, sprinklers, 2 blocks from El Camino, 10% down, \$24,950. Huntington Bch., 714-842-2636. A  
**Apt.**, close to schools, bltins, pullman-type kitchen, 4-bdrms. or 3-bdrm. & den, 1/2-bath on 1st flr., 2 baths on 2nd, dps., cpts., 2-car gar., pvt. patio, clubhouse, lge. pool, \$29,500. Torrance, 327-3160. A  
**Ford**, 1960 Starliner, w/s/w, p/s, p/b, r/h, new reverb. radio, low mileage, \$500. El Segundo, EA 2-6595. A  
**Washer-Dryer Comb.**, Philco Bendix, \$35. Torrance, 329-6748. A  
**Projector**, movie, 8mm, Mansfield Holiday, ultra-automatic, used 3 times, \$60. Lynwood, 638-3423. A  
**Surfboard**, Bing, 8'8", no dings, \$40. Inglewood, 757-7824. A  
**Buick**, 1962 Skylark convt., p/s, p/b, p/top, \$1055. Somis, 805-482-1186. A  
**Bicycle**, boy's 16", sidewalk, Sting Ray-type, \$15. Gardena, DA 9-4675. A  
**Corvair**, 1960, 700 series, 4-dr. sedan, r/h, stick shift, new brakes, seat covers & battery, \$350. Hawthorne, 675-4267. A  
**Boat**, 13' fiberglass, Wizard, tilt trailer, no motor, \$295. P.V. Estds., 378-3055. A  
**Dining Table**, Danish modern, hutch, 6 chairs, \$100. Gardena, DA 9-9621. A  
**Ducati**, Scrambler, 250 cc, 1965, approx. 1500 miles, many extras, \$495. Hawthorne, 676-9736. A  
**House**, 3-bdrm., family rm., 2-bath, cpts., dps., bltins, dishwasher, fenced yd., 2 yrs. old, \$2000 or less dn. to an existing 5 1/4% FHA loan, in Huntington Bch., \$21,300 or \$155 mo. rent. Torrance, DA 9-9464, DA 7-8934. A  
**Motorcycle**, 1964 Yamaha YA5, elec. start, turn signals, just o/hauled, \$325 value; \$295. Torrance, DA 6-7528. A  
**VW bumper**, front & rear for sedan, complete w/parts, \$15 ea. Huntington Bch., 714-897-8201. A  
**Chair**, antique oak, leather covered, \$45. Playa del Rey, 823-4167. A  
**Childcraft Books**, complete set, \$15. L.A., 670-5627. A  
**Couch & chair set**, Danish modern, green, \$85. Inglewood, 673-1589. A  
**Boat**, 1965 Dorsett, fiber glass, 16', sleeps 2, bait tank w/Wallstron trailer, 65 h.p. Mercury eng., \$2300. Gardena, FR 1-3444. A  
**Falcon Ranchero**, 1963, 260 Cobra, Hydro, 16 tires, spare parts, tow bar, \$1500. Long Bch., 421-2255. A  
**Range**, Frigidaire custom deluxe elec., 30", cost \$330; \$150. Garden Grove, 714-892-2829. A  
**Crib**, w/mattress, 4 yrs. old, orig. cost \$50; \$20. Harbor City, 213-325-8175. A  
**Travel Trailer**, Shasta, 16', 1965, self-contained, sleeps 4 to 6, elec. brakes, & hitch, cost \$2200; \$1700. Hawthorne, 371-9931. A  
**Honda**, 300, 1966, 3600 miles, \$450. Torrance, 325-6546. A  
**Stereo Tuner**, FM, Fisher, 500-C, 75-watt, \$295. Torrance, 371-2137. A  
**Home**, 3-bdrm., 2-bath, fam. rm., elec. kitchen, dble. ovens, dishwasher, cpts., dps., sprinklers, patio, lge. yd., in Hollypark, \$27,500. Gardena, 323-8657. A  
**Chevelle**, 1966, 396-60 SS, 13,000 miles, 4-spd., AM-FM radio, new clutch, \$2300. Manhattan Bch., 374-8650. A

**For Sale**  
**Guitar & Amp.**, elec., never played, cost \$95; \$60. So. Gate, 633-4477. A  
**Tape Recorder**, 3-spd. stereo, 3 speakers, Telectro SS461, det. wing speakers, used approx. 60 hours, \$150. Hawthorne, 679-7618. A  
**Sloop**, Columbia Challenger, 24', fiberglass, all racing-cruising gear, incl. spinnaker, 2 genoas, galley, motor, life-lines, \$5500. Box 2401 or Oxnard Bch., 805-483-1876. A  
**Chevrolet**, 1963 Bel Air, 9-pass. sta. wag., auto. trans., p/s, p/b, r/h, luggage rack, trailer hitch, new tires, \$1525. Orange, 352-3743. A  
**Honda**, 305 Super Hawk, 1965, new clutch, battery, paint & tires, \$525. P.V. Pen., 377-6352. A  
**Income Property**, 2 houses, 2-bdrms. ea. on 1 lot, triple garage, fenced yard, \$29,900. Torrance, DA 9-3706, 323-1400. A  
**Bicycle**, boy's, 24", American made, \$15. Torrance, FA 8-3306. A  
**Movie Camera**, 8mm Argus, & projector, turret lens, \$65. Brea, 529-3531. A  
**Chevrolet**, 1966 Malibu, 327 cu. in., 4-spd., posi-traction, b/seats, \$225 & take over \$94 mo. pymts., approx. bal., \$2800. Gardena, DA 7-8412. A  
**Freezer**, 1961, Majestic, upright, white, 22 cu. ft., \$185. Torrance, TE 5-7005. A  
**Guitar**, elec. Fender Stratocaster, & case, \$225. Torrance, 371-9925. A  
**Wall Heater**, 2 Thermador, 220 volts, w/blower & thermostat, 3 1/2"x14 1/2"x21" for wall mounting, cost \$65 ea., \$20 ea. Redondo Bch., 370-9138. A  
**El Camino**, 1959, 4-spd., custom interior, \$1000. Hawthorne, 671-9306. A  
**Radio & Record Player**, Motorola Hi-Fi, AM-FM Harman Kardon tuner, 4-spd., \$75. Hermosa Bch., FR 4-6685. A  
**Organ**, Hammond M-3 spinet w/almost new Hammond PR-40 tone cabinet & bench, \$1195. Box 2402. A  
**Boat**, 15' fiberglass, 43.7 h.p. Scott o/board, trailer, 2 single skis, tow rope, jackets, 2 gas tanks, 12V battery, misc. extras, \$795. Torrance, 371-3753. A  
**Ford**, 1954 convt., T-Bird eng., \$150. Inglewood, 644-2018. A  
**Hillman**, Super Minx, new r/h, 12,000 miles, \$850. Gardena, 532-4368. A  
**Accordion**, 120-bass La Scala, used four mos., cost \$487; \$275. Culver City, 836-4934. A  
**Surfboard**, Roberts, 10' t-band, clear, black glass, skag tail block, \$80. Hawthorne, 676-8738. A  
**House**, 5-bdrm., extra lge. living rm. & den, 2 1/2 bath, 2700 sq. ft., w/w cpts., dps., all elec. bltins, patio, 5 yrs. old, on hillside, 2 lge. fireplaces, \$39,950. La Habra, 691-5166. A  
**Racing Bicycle**, Schwinn Continental, 10-spd., \$50. P.V., 377-6515. A  
**SK Outboard**, 1966, 95 Merc. & trailer, \$2100. Hawthorne, 370-7732. A  
**Ford**, 1957 wagon, Country Sedan, auto. trans., \$175. Hermosa Bch., FR 4-3164. A  
**Buffet**, old-fashioned, & 6 chairs, \$125. Inglewood, 674-1796. A  
**Austin Healey**, 1958, Sprite, 1962 drive train, many extra parts, good tires, top & has roll bar, \$225. Torrance, FR 8-1102. A  
**Chevrolet**, 1965, Impala, fac. air, p/s, new tires, radio w/rear speaker, p/windows, \$2650. Lakewood, HA 5-0229. A  
**Book**, Advanced Engineering Mathematics by Wylie, new 3rd edition, cost \$11; \$10. Lawndale, 675-6803. A  
**Mustang**, 1966, 007, 3-spd., 289 V-8, r/h, 8000 miles, \$2300. Torrance, 375-0165. A  
**Fishing Rod**, Trueline Dynamo, VL7-2, 1 yr. old, \$15. L.A., 837-4596. A  
**Mountain Cabin**, 1000 sq. ft., 5-rm., complete w/bltins, garb. disp., forced air wall furnaces & lge. wood-burning fireplace, in Wrightwood, Calif., \$18,500. Thousand Oaks, 805-495-5967. A  
**Watch**, gold, men's Movado, calendar w/date, day of week, & month, 18-K gold case, \$20. Marina del Rey, 823-2655. A  
**Drill Press**, 9" bench, swing-a-way, w/motor, \$35. Downey, ME 3-6082. A  
**Ski Rack**, for VW, holds 4 pair, \$5. L.A., 645-1274. A  
**Hide-A-Bed**, Simmons, traditional styling, wine Naugahyde, orig. price \$220; \$100. Torrance, 320-5846. A  
**Rambler**, 1964, Classic, 8-cyl., 2-dr., r/h, 2600 miles, p/b, p/s, w/s/w tires, \$1300. Hawthorne, OS 6-4231. A  
**Yamaha**, 1966, YDS-3C Big Bear Scrambler, heads milled & polished, big tires, \$500. L.A., 645-1523. A  
**Rifle**, Mannlicher-Schoenauer, .257 cal. Weatherby, fully engraved Premier grade w/3-9X Redfield scope on G & H mounts, incl. reloading dies & orig. box of ammo, 10 rounds fired, cost new \$1046; \$675. Hawthorne, 679-7544. A  
**Boat**, 16' Traveler Atlas Deluxe, new in June, '66, 80 h.p. Evinrude eng. w/pushbutton trans., fully equipped, American tilt trailer, lge. wheel, orig. cost \$3100; \$2200. Canoga Pk., 340-6419. A  
**Porsche**, 1963 coupe, r/h, new tires, \$2600. Santa Monica, 395-7368. A  
**Television**, 19" Admiral, 1965, UHF all-channel w/stand, cost \$140; \$90. Hawthorne, 675-9681. A

**For Sale**  
**Radio Transmitter**, amateur, Heathkit DX100, \$55. Hawthorne, OS 6-6949. A  
**House**, 3 baths, 3-bdrm, large rumpus rm., 2400 sq. ft. on 1/2 acre lot, 4 yrs. old, located in La Habra, low down payment if buyer qualifies, Norair Credit Union, Ext. 1117. A  
**Ford**, 1965 Galaxie, 26,500 miles, air cond., p/s, p/b, \$1950. Pac. Palisades, 454-5001. A  
**T-Bird**, 1960 convt., orig. owner, 52,800 miles, 3-spd. stick shift, new tires, clutch & trans., \$500. Manhattan Bch., 454-2090. A  
**Boat**, 14' runabout, 25 h.p. Merc., steering controls, lge. wheel trailer, gas tank, life preservers, \$200. Simi, 805-526-7767. A  
**Pups**, collie, AKC reg., 2 blue, 2 tri, 2 sable, \$100 to \$50. Torrance, 371-2159. A  
**House**, 2-bdrm., in Running Springs, 6000 ft. elevation, 2 yrs. old, 1000 sq. ft., lge. living rm., fireplace, bltins, \$14,500. Wilmington, 834-4184. A  
**Wheels**, 4 mag-style, aluminum, 15", \$75. Lakewood, 634-8632. A  
**Thunderbird**, 1955, rebilt. eng., chrome wheel, new paint, \$900. Gardena, 324-5938. A  
**Ford**, 1961 Fairlane 500, 2-dr. r/h, \$325. Rolling Hills, FR 7-1732. A  
**Love Seat**, light maple, makes into bed, yellow, olive, white flowered Naugahyde, \$85. Gardena, DA 3-5497. A  
**Studio Couch**, \$25. Hawthorne, OS 6-3410. A  
**Headboard**, matching bookcase, & 2 night stands w/3 drwr. ea., blonde finish, plate glass tops, \$60. Torrance, DA 5-5245. A  
**Sail Boat**, Kite 11'7" racing dinghy & trailer, \$675. Hermosa Bch., 376-3693. A  
**Honda**, S-90, luggage rack, dual mirrors, helmet, cost \$450, \$300. San Pedro, TE 3-4272. A  
**Projector**, 8mm Tower model, 750 watt, forward, still, reverse & rapid rewind, \$25. Hawthorne, 675-8413. A  
**Bicycle**, girl's 20", new tires & tubes last year, \$10. P.V., Pen., FR 7-4317. A  
**Volkswagen**, 1965 sedan, 13,000 miles, \$1475. Rolling Hills Estds., 377-0679. A  
**Stereo**, Magnavox, 3-pc. component, \$100. Torrance, 328-3576. A  
**Chevrolet**, El Camino, 1959, 4-spd., r/h, newly painted & reuphol., good running cond., \$695. Hawthorne, OS 5-7938. A  
**Pups**, Pomeranians, AKC, broods & stud, \$75. & up. Lawndale, 371-0886. A  
**Train Parts**, HO cars, engines, track, switches & accessories, \$25. Torrance, 371-8395. A  
**Couch & chair**, \$25. Hawthorne, 676-3883. A  
**Poodle**, male, toy, white, AKC, \$50. Hawthorne, 675-8360. A  
**Surfboard**, yellow fiberglass, \$75. Box 2403. A  
**Sunbeam Rapier parts**, for 1960, 2-dr. h/top, 4-spd. o.d. trans., \$25, other parts, various prices. Lynwood, NE 5-3294. A  
**Interest**, 1/6, 1961 Piper Colt, ideal for getting pilot's license, time-bldg., \$300. Hawthorne, 674-8170. A  
**Speaker Enclosures**, 2 solid light oak, modern, for 12" speakers, console type 30" high, \$30 pr. L.A., VE 8-3255. A  
**Truck**, 1965 Chevrolet, w/1965 deluxe shell camper, long wheel base, wide bed, 8000 miles, new car warranty, \$2300. Ingiewood, OR 4-0870. A  
**Home Bar**, 2 stools, glassware & all access., \$50. Redondo Bch., 370-8350. A  
**Mustang**, 1965 convt., V-8 eng., auto. trans., p/s, \$1850. Rolling Hills, 547-2716. A  
**Aquarium**, 22-gal. w/variety of trop. fish, u/ground filter, artificial plants, fluorescent light & stand, heater & aerator, \$40. Hawthorne, OS 5-1847. A  
**Drafting Machine**, Bruning, 1964 model, \$65. Torrance, DA 4-7892. A  
**Mobile Home**, 1957, Universal, 8'x40', 2-bdrm., lge. bathroom, awning, furn., storage cab., near Northrop, \$1500. L.A., 754-7289. A  
**Accordion**, 120-bass, \$95. Redondo Bch., FR 5-4448. A  
**Bicycle**, girl's 20" w/training wheels, convert to Sting Ray, \$12. Redondo Bch., 378-7116. A  
**Chord Organ**, Magnus, wood console, cabinet incld., cost \$149; \$65. Maywood, LU 2-1073. A  
**Mattress**, Sealy Deep Sleep, & matching box spring, full size, tuftless, \$40. Hawthorne, 675-8829. A  
**Honda**, 1965 150cc, new clutch, good tires, Hawthorne, OS 5-4380. A  
**TV**, black & white 23", Packard Bell, maple console w/doors, remote control, \$75. Harbor City, 326-1856. A  
**T-Bird**, 1961, full power, factory air cond., \$1150. Inglewood, 677-7430. A  
**Volkswagen**, 1965 1500S Variant, \$1750. Anaheim, 828-3718. A  
**Rug**, braided, oval, 9'x12', \$35. Gardena, 323-8905. A  
**Camera**, Yashica 8mm, light meter, type A filter, power zoom lens, pistol grip, light bar, \$70. Torrance, 378-0493. A  
**Freezer**, 19 cu. ft., upright, new motor & freezer unit, \$135. Lakewood, HA 1-5128. A  
**Phonograph**, Magnavox, portable, stereo, \$40. Redondo Bch., 372-8502. A  
**Hi-Chair**, Cosco, blue plastic covered seat & back, chrome tray & legs, \$7. Rolling Hills Estds., FR 5-9689. A

**For Sale**  
**High Chair-Youth Chair Comb.**, good cond., \$7. P.V. Pen., 377-9666. A  
**Guitar**, Kay, w/case, practically new, \$35. Torrance, DA 6-8273. A  
**Battery Charger**, Universal 6V-8V-12V, for car or boat, \$4.40. Box 2404. A  
**Bicycle**, 20" Stelber, w/training wheels, needs repair, \$10. Torrance, 371-5916. A  
**Wanted to Buy**  
**Pickup Truck**, for transportation & second car which runs good, no auto. trans. Hawthorne, 679-4237. B  
**Supercharger**, Paxton McCullough, VS-57, also elec. or gas welding equipment. Whittier, OX 3-4117. B  
**Dog House**, w/waterproof roof. Hollywood, HO 3-5337. B  
**Skis**, metal or wood, good condition. Will pay up to \$50. P.V. Pen., 377-4489. B  
**Rentals Offered**  
**Apt**, 1-bdrm., furn., modern, cpts., dps., bltins, air-cond., convenient to frwys., 20 min. to Norair, \$105 mo. Mar Vista, 391-7781. A  
**Apt**, furn., single, including utilities, patio, kitchen, \$85 mo. Manhattan Bch., 545-1111. A  
**Apt**, lge. 1-bdrm., furn., walking distance to Northrop, \$90 mo. Hawthorne, OS 6-4734. E  
**Apt**, 2 & 3 bdrms., furn. & unfurn., bltins, cpts., dps., pool, recreation room, sauna bath, 5 minutes from Northrop, \$145 & up. Hermosa Bch., 372-5808. E  
**Apt**, 1-bdrm., cpts., dps., bltins, 1-car gar., 2 blocks from Northrop, \$95 mo. Hawthorne, OS 5-5736. E  
**House**, unfurn., 3-bdrm., 2 1/2 bath, lge. pool, patio, dress. rm., family-dining rm., stone fireplace, cpts., dps., bltins, incl. water, yard & pool care, option to buy, \$290 mo. Inglewood, 644-2565. E  
**Apt**, 1-bdrm., extra lge., pvt. patio, \$150. L.A., 681-9474. E  
**Vacation Cottages**, Idyllwild, 1 & 2 bdrms., fireplace, stream, patios, \$20-\$35 w/ends, \$45-\$70 wk. L.A., PL 4-5288. E  
**Apt**, 1-bdrm., cpts., dps., bltins, 2 mins. from Norair, unfurn., \$105 mo. Hawthorne, 679-3217. E  
**Apt**, 1-bdrm., conv. den, 1 1/2 bath, all elec. kitchen, fireplace, patio, full rec. privileges, on golf course near Del Amo Center, \$235 mo. Rolling Hills Estds., 325-7161, 373-3060. E  
**Vacation Cabins**, Lake Gregory & Crestline, \$25 w/ends; \$60 wk. Venice, EX 1-2040. E  
**Exec. Apt**, 2-bdrm., 2-bath, 1600 sq. ft., lux. features, \$200 mo. Inglewood, 670-6084. E  
**Apt**, 2-bdrm., unfurn., cpts., dps., bltins, closed gar., pvt. patio, not water & trash paid, \$125. Torrance, FR 5-0867. E  
**Apt**, 1-bdrm., furn., or unfurn., w/w opt., dps., forced air heat, bltins, 2 blocks from Norair, adults only, \$95-\$110. Hawthorne, OS 6-5425. E  
**Apt**, 1-bdrm., deluxe, pool, \$95. Redondo Bch., 376-2117. E  
**Apt**, 2-bdrm., dining rm., laundry rm., water, trash paid, gar., across from shopping, \$95 mo. Hawthorne, 325-5705. E  
**Apt**, 2-bdrm., 1 3/4 bath, all elec. bltins, cpts., dps., ground flr., no children under 16, gar., near Del Amo shopping center, \$150 mo. Torrance, 830-4406. E  
**Bachelor Apt**, utilities incld., no pets, a few blocks to Northrop, \$65 mo. Hawthorne, 679-8394. E  
**Apt**, near King Harbor, half block from shopping center, piped music, bltin vacuum, \$95 & \$105. Redondo Bch., FR 6-9608. E  
**Rentals Wanted**  
**House or Apt**, lge. 2-bdrm., in Redondo Beach or Hawthorne, will manage apts., under \$90. Redondo Bch., 374-8232. F  
**Child Care Offered**  
**In my home**, hot lunches, 6' brick fenced yard, play equipment. Redondo Bch., DA 4-6155. G  
**Child Care Wanted**  
**Light Housework**, & 1 school child & 1 preschool, room & board plus small monthly salary. Hawthorne, 675-5265. H  
**Woman** to come to my home & care for 2 children, ages 4 & 5, own transportation, from 7:30 a.m. to 5 p.m. Gardena, 323-8165. H  
**Personals**  
**Fly** new Cessna 150 Commuters, \$7 per hr. wet, students welcome, 2 flight instructors, 4-place to be added soon. Torrance, OS 6-6138, DA 5-5288. L  
**Thanks** to all my friends at Norair & Nortronics for the cards & calls I received while in the hospital. Am now at home & calls will be appreciated. MAE E. IVY. L  
**Roommate wanted**, girl, 31-30 to share w/same, Anaheim area, very reasonable, Box 2405. L  
**For Sale or Trade**  
**Trombone**, Beuscher Grand, \$65 or trade for clarinet. P.V. Pen., 377-3806. M  
**Barbecue**, gas, Charmglow, even-controlled flame w/rotisserie, chicken bask., shelf, never been used, retail price, \$102; \$75 or consider trade for stereo tape equip. San Pedro, 831-4526. M

**Rides and Riders**  
**Rides Wanted**  
**7 a.m. — 3:42 p.m.**  
**Imperial & Brea Blvd.**, Brea. Lois J. Varay, Norair, ext. 1485, 529-3538.  
**Rosecrans & Luitweiller**, La Mirada. Jean Wigley, Norair, ext. 1834.  
**8 a.m. — 4:42 p.m.**  
**Western & Normandie**, Los Angeles. Mornings only. Margaret Paulos, Nortronics, Haw., ext. 603, PL 6-4389.  
**Sepulveda & Devonshire**, Granada Hills. R. J. Rothstein, Norair, ext. 1188, 360-1377.  
**Simi Valley &/or Thousand Oaks** to Hawthorne. Paul Schapp, Nor. Haw., ext. 833, 805-526-7767.  
**Rides Offered**  
**8 a.m. — 4:42 p.m.**  
**Sepulveda & Devonshire**, Granada Hills. R. J. Rothstein, Norair, ext. 1188, 360-1377.  
**Simi Valley &/or Thousand Oaks** to Hawthorne. Paul Schapp, Nor. Haw., ext. 833, 805-526-7767.

Four Norair People Are Honored For Attendance Records

Mrs. Rose Rose, a Northrop Norair employee since 1950, was late to work on July 8, 1952.

That's not too significant, you might think, but it is significant that in the 14 1/2 years since then, it hasn't happened again.

And Mrs. Rose, who is in Electrical Assembly on the Boeing 707 wing panel section, has never been absent from work in her 16 1/2 years with Northrop.

She joined Norair on January 20, 1950, compiling a perfect attendance record until that July day two years later. She had a month-long leave of absence in 1956, but never a recorded absence or another late day.

When you consider how easy it is to (1.) ignore the alarm clock, (2.) discover that your battery is dead or (3.) get snarled in traffic, that's an amazing record.

Equally outstanding is the record of Charles Edwards of Norair Manufacturing Control, who joined the company on February 24, 1954.

Mr. Edwards was absent on September 22 of that year, and missed another day on July 16, 1959. He's never been late, and hasn't missed a day of work in more than seven years.

That means that in the approximately 3200 working days he's been with Norair, Mr. Edwards has a record of 3198 and 2.

Everett Clark of Plant Protection, in his 15 years at Norair, has a record of one absence and one late day. And Paul Welter of the Boeing Wing assembly control booth section has been absent only three times in the past 11 years.

There's more to a perfect attendance record than the knowledge that you've established a reputation for reliability, too.

Each year, hourly paid employees in Norair Manufacturing who have compiled perfect or near-perfect attendance records for that year, are guests at a luncheon given in their honor.

The employees are given a certificate commending them for their reliability.

**For Sale or Trade**  
**Acreage**, 5-acre bldg. site near Rosamond, \$3450 or trade \$1500 equity for car, bal. \$1950 at \$20 mo. inc. 6% interest. Torrance, FR 8-1026. M  
**Accordion**, Excelsior, white, 120-bass, variety of switches on both bass & treble, \$1000 or trade for Steinway upright piano, dk. wood finish. Inglewood, 674-4192. M



## Wilcox Heads New Library Committee

Newly published and available for reference in the Anaheim Technical Information Center is the Orange County Library Association's "Union List of Periodicals in Orange County Libraries."

Over 40 contributing libraries have agreed to make their current subscriptions to magazines and periodicals, plus backholdings of these publications, available to other members of the association, either on an inter-library loan basis or within the holding library.

The total subscriptions listed represent an enormous investment, particularly in the fields of technical and scientific literature.

Access to this material greatly increases the potential of any member library. Chairman of the OCLA committee for this project is Nortronics' librarian, Gordon Wilcox.

Another extended library service for Nortronics personnel is company-sponsored borrowers cards for use of the full library facilities at Cal State in Fullerton, the University of California at Irvine and the University of California at Los Angeles.

These cards may be obtained in the Technical Information Centers.

### TEAMS

(Continued from page 1)

been made on the production system as a part of the Navy contract for TEAMS. Mr. Withee said that "If a malfunction occurs, because the system monitors its own performance and provides for rapid identification of the failed part, it takes less time to complete any specific repair. This is a vital element to the Navy."

Mr. Withee pointed out that Nortronics was conducting studies for other uses for TEAMS. "There is every possibility," he said, "of a time when every operating characteristic of a ship will be monitored from a central location. This, in the long run, will maintain a continuous check on ship performance and with a consequent increase in reliability and durability of the elements required to maintain top operational performance."

Present plans are for delivery of the USS Knox in early 1968. The Knox will have an over-all length of 438 feet, a beam of about 47 feet and a full load displacement of 4000 tons.

## Sophie Adams' Sons Serve on Two Seas

Mention U.S. Navy activities in the east or west around Nortronics' Sophie Adams and you have yourself an interested listener.

That's because Sophie has two sons in the Navy, one serving on the Atlantic, another on the Pacific.

Sophie is an electronic assembler at Hawthorne who has been with Northrop 12 years.

Her sons, Robert, 21, and Frederick, 18, entered the Navy within a week of one another a year ago.

Robert is now a seaman aboard the USS Fort Snelling, a dock landing ship sailing out of Norfolk, Virginia, with the Atlantic Fleet's Amphibious Force. He is currently en route to Ascension Island for duty in recovery forces serving a forthcoming Titan III heat shield test.

Frederick is a radar seaman aboard the USS Bon Homme Richard, an aircraft carrier soon to be deployed with the Seventh Fleet in the Western Pacific. Currently, the ship is in Long Beach for overhaul.

## Northrop Youngsters To Greet Saint Nick At NRC Yule Party

December 17 and 18, Northrop Recreation Clubs at two locations raise the "magic curtains" to present their annual spectacular just for the very young—Children's Christmas Parties.

Expected attendance at the two affairs is 9000.

Children of Northrop Norair employees, plus Northrop Nortronics employees at Hawthorne and Palos Verdes, will be feted December 17 at the Hollywood Palladium.

Nortronics Anaheim youngsters gather the following day (December 18) at NRC Clubhouse, Fullerton.

Invitations for both events were distributed with paychecks. Tickets are now in the process of being distributed, based on specific request.

The Hollywood Palladium event is actually three shows, repeated to take care of an estimated 7500 expected to attend. They will be staged at 10 a.m., noon and 2 p.m. Tickets are being distributed for specific shows.

Those attending the Anaheim affair will also find entertainment planned especially for them between 12:15 and 4 p.m.

## Guzinski, Paramore Picked by Councils

Northrop Recreation Clubs at Anaheim and Hawthorne-Palos Verdes have named Chet Guzinski and Dick Paramore respectively to preside over NRC Councils serving the two facilities.

As president at Anaheim, Guzinski will head a slate of officers that includes Orville Mitchell, vice president; Sally Willsey, secretary; Bill Kieffer, treasurer, and Jack Kinzer, sergeant-at-arms.

Serving the Hawthorne-Palos Verdes NRC Council with President Paramore will be Maury Shulman, vice president; Dorothy Baldwin, secretary; Jeanne Andrecht, treasurer and Danny Gravelin, sergeant-at-arms.

Installation of both slates of officers will come in January.

## Archers, Pistoilers Having Fun in Feud

Down at Nortronics Anaheim NRC a feud, of sorts, is brewing that may well outlast the fabled Martin-McCoy differences.

It involves the age-old question as to which is the better marksman, an archer or a pistol shooter.

Eighteen months ago the NRC Gun Club challenged the Archery Club to a match to settle the matter. The pistoleers won on a wet and cold day and the archers demanded a rematch. This came off in September. The archers won. So nothing has been settled.

Right now the two groups are planning another contest, to be held in January or February. In fact, they like the whole idea and may make the competition an annual or bi-annual affair.

George Garner and George Stellmacher helped set up the original competition.

There are even a few people who consider Mr. Garner a "turncoat." He competed with the pistol shooters in the first match, the archers in the second. Archery, he says, gives him a chance to shoot every day of the week at NRC-provided targets available at Anaheim. He has to go to a range to shoot pistols.

## Employees Turning Thoughts to Others

Christmas is just around the corner and Northrop Nortronics personnel throughout West Coast operations are once again turning their thoughts to others less fortunate.

This is the tradition of Christmas at Nortronics.

It means that needy families, hospitals and charitable organizations faced with the possibility of a bleak holiday season will have instead a joyous one because Nortronics people care enough to share.

The program this year, and in years past, is more or less spontaneous and entirely voluntary. Nortronics employees support the program in lieu of exchanging Christmas cards and gifts with one another.

There is no set formula for the program.

Some groups select "needy" families and direct their efforts toward providing for members gifts, food and clothing. Others elect to donate toward specific items for hospital wards or charitable functions.

Personnel Services offices at each Nortronics facility help coordinate the over-all program.



FIRST EXECUTIVE SESSION—Newly-elected NRC officers at Nortronics Anaheim gather for their first executive session. They are (left to right) Chet Guzinski, president; Jack Kinzer, sergeant-at-arms; Sally Willsey, secretary; Bill Kieffer, treasurer and Orville Mitchell, vice president. Officers will be installed in January of 1967.

## NORTHROP REPORTS BIG BACKLOG HIKE IN FIRST QUARTER

Northrop Corporation had first quarter earnings of 60 cents per share on 4,211,187 shares outstanding at October 31, 1966, a 46 percent increase over the 41 cents per share earned on 4,160,636 shares outstanding a year earlier, Thomas V. Jones, president, has reported. The total earnings for the first quarter of fiscal year 1967 amounted to \$2,527,000 compared with \$1,691,000 for the same period a year ago.

Sales for the quarter totaled \$102,005,000 compared with \$70,563,000 a year ago.

"As a result of growth mainly in aircraft, communications systems and advanced weaponry, we expect total sales for the current fiscal year to approach the \$450,000,000 level," Mr. Jones stated. "We expect earnings this year to be higher than last year despite the fact that we are doing considerable work that will not be reflected in sales or earnings for another year or two," he said. Northrop sales for fiscal 1966 totaled approximately \$359,000,000.

### Backlog Has Increased

"Our backlog of orders at October 31 amounted to \$557,000,000 and is well diversified as to product area," Mr. Jones said. Backlog a year ago totaled \$285,000,000.

"We expect the F-5 Freedom Fighter to continue to make important contributions to sales and earnings as other allied nations select the airplane," Mr. Jones said.

"On the Boeing 747 program, we are in the midst of the tooling, engineering and development phases. This program is scheduled to contribute significantly to sales beginning in fiscal 1969. We currently expect about \$500,000,000 in business on this program, but only \$111,000,000 of this is included in the company's backlog figure," Mr. Jones stated.

## Anaheim Marksmen Plan Silverado Range Shoot

Nortronics Anaheim Gun Club members gather at the Silverado Sportsman's Range at 9 a.m., Sunday for a monthly shoot.

Events scheduled include pistol trophy matches, handicap small and large bore rifle matches and DCM small bore, large bore and pistol shoots.

The club has pistols and rifles for use by members, but individuals must bring their own ammunition.

## 'Gemland Heritage' is Winning Show Title

"Gemland Heritage" has been selected as the title and theme of the 1967 NRC Gem and Mineral Club show set for March 11 at Hawthorne Memorial Auditorium.

Sophia Matthews submitted the prize-winning name in a contest open to all members. Mrs. Matthews' husband, Frank, of Norair Quality Control, submitted winning names in both 1965 and 1966.

The announcement of the winner was made at the club's annual Christmas party over the past weekend at NRC Clubhouse, Hawthorne.

Ken Potter, show manager, also revealed the names of a special show advisory board and special committee chairmen.

The advisory board is composed of Dick Hicks, Frank Matthews, Jackie McCoy, Mike Michels and Juanita Nelson.

Committee chairmen are Lois Paris, Helen Robinson, Dick Hicks, Bill Reichel, Roy McCoy and Howard Harding. Rose Elwell and Elinor Greenwood, Herb Elwell, Ella Sanders and Jonnye Potter, Vi Kozlow, Jim Latham, Morrie Morris, Dave Johnson, Art Cohee and George McGilligan, Rex Russell, Harold Davis, Whitey Nelson, Vernon and Rosalie Boyd, Toy and Yuzy Sato, Aileen Townsend and Sophia Matthews, Marilyn Latham and Ruth Reichel, and Austin Bennett (two names denote committee co-chairmen).

## Night Owls Seek Bowlers

Full time or substitute bowlers are needed to man teams participating in the Nortronics Anaheim Night Owls league rolling at a.m., Saturday at Carter Bowl, Fullerton.

Contact Keith Hughes at ext. 441.

## BUCKBEE

(Continued from page 1)

Commander Buckbee has spent the majority of his long military career in the submarine service. He enlisted in the Navy in 1937 and rose to the highest enlisted rank before being commissioned.

He has served aboard such submarines as the USS Sturgeon, Drum, Ray, Sabalo and Ronquil. He was executive officer aboard one submarine rescue ship and skipper of another. He is a qualified diver (deep sea/helium oxygen/SCUBA) and former director of the Escape and Rescue Department, U.S. Navy Submarine School.



SIXTY YEARS at Northrop is the total service time of (from left) Charles Chidester, Adam Krauszer and Lloyd Balsam, as the three receive their 20-year pins from Ross Miller (right), Nortronics vice president and manager-Technical. Mr. Miller presented the pins on November 9, before an employee gathering at Nortronics Hawthorne.



# NORTHROP NEWS

Holiday  
Greetings  
1966

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# Shareholders Hear Sales Forecast

## T.V. Jones Sees Rise of \$90 Million

Northrop President Thomas V. Jones told company shareholders at the annual meeting last week that he expects Northrop sales in fiscal 1967 to approach the \$450,000,000 level, an increase of \$90 million over the record high of fiscal 1966.

The first quarter of fiscal 1967, which ended October 31, has already started the business year off to a new record setting pace. Sales for the quarter totaled \$102 million compared with \$70 million in the same period last year. It was the best quarter, with one exception, in the company's history.

While Mr. Jones could foresee new record sales in 1967, he told shareholders he was reluctant to say that the company would maintain the 2.9 percent profit margin posted in 1966. He cited higher taxes and higher interest rates as two factors which might retard earnings. He added that even so he expected total dollar earnings and per share earnings to be higher than last year.

Among other significant points made by Mr. Jones in his brief address were:

—Sales of the Boeing 747 jet transport may be double the number upon which Northrop based its initial calculations as to earnings potential. Original estimates of the value of Northrop's work on the world's largest passenger jet were in excess of \$400 million based on 200 shipsets.

—Northrop Carolina, which Northrop acquired last year, has increased its sales very substantially, and "we feel it has been an advantageous acquisition."

—Of the five major areas of Northrop business — aircraft, communications, electronics, advanced weaponry, and space — communications and advanced weaponry will make the biggest gains in fiscal 1967.

—Although Northrop is a contractor to Boeing on the supersonic transport (SST), the company's know-how in structures and in the handling of titanium should be useful to whoever wins the SST competition.

—The company is now active in 50 countries, and, Mr. Jones said, "there is almost nothing that we do whose in-

### Speakers to Begin Eight-Week Class

A "Speakeasy" course in public speaking, sponsored by the Northrop Norair Toastmasters Club, will begin on January 12, club officials have announced.

The course will be held on eight consecutive Thursday nights, starting with the January 12 meeting, in the Norair Executive Dining Room.

Further information may be obtained by contacting Felix Dunnett of Norair Management Systems on Ext. 1146.

Mr. Dunnett was one of three Norair Toastmasters members who led the group to a "sweep" over the Westchester Toastmasters in competition early this month.



A CHRISTMAS VISIT to Northrop Corporation facilities finds President Thomas V. Jones (left) talking with Frank McIntire, a Northrop Ventura machinist. Mr. Jones visited Ventura on Monday, and toured other local facilities later in the week.

### CAPABILITY STRENGTHENED

## Nortronics, Space Laboratories Form New Technical Systems Organization

Establishment of a topflight technical organization to be known as the Northrop Systems Laboratories has been announced by Thomas V. Jones, Northrop president.

The new laboratories will be a department of Northrop Nortronics and will be formed by combining certain of the advanced scientific activities of Nortronics with those of Northrop Space Laboratories.

Dr. V. W. Howard, formerly vice president and manager of the space laboratories, will head the Northrop Systems Laboratories and will be a vice president of Nortronics. He will report to Fred Stevens, corporate vice president and Nortronics general manager. Dr. Howard will make his headquarters at Nortronics Palos Verdes.

"One of the growing requirements of our customers is the need for new systems in the broad area of enabling man to operate effectively in new and relatively unfamiliar environments," Mr. Jones said. "For example, such systems are essential in any space system, in military command and control, in intelligence gathering, in identification and measurement, in the deep ocean environment, in the management of highly scientific programs, and in technically advanced airborne operations."

The new NSL — Northrop Systems Laboratories — is so named because, according to Mr. Jones, "a systems approach is absolutely essential in these areas."

Typical of the enhanced strength provided by the new organization is the joining of the outstanding optical and electro-optical work of Nortronics with that of the space laboratories.

Nortronics has long pioneered precision optical research and development on the West Coast, opening up a field

formerly dominated by Eastern optical experts. The space laboratories also have developed exceptional research talents in optics, directed originally to space requirements. Now the work of these two highly-advanced organizations will be combined in a larger, stronger activity capable of being even more responsive to customer needs.

"The new department will strengthen our capability in important areas and will provide opportunity for an interdisciplinary approach to many of the projects involved. Our confidence in the technical leadership and personnel of the new department leads us to believe that it will make an important contribution to the technical stature of Northrop," Mr. Jones said.

## HALLICRAFTERS CHANGE NEARS FINAL APPROVAL

A contingent of Northrop legal and financial representatives are in Chicago this week meeting with their counterparts of Hallcrafters for the purpose of approving and executing documents which will make Hallcrafters the newest member of the Northrop Corporation family.

Shareholders of both companies voted their approval of the acquisition last week at their respective annual meetings in Hawthorne and Chicago.

To make the acquisition possible, Northrop shareholders authorized one million shares of a new preferred stock, which is listed on the New York Stock Exchange for the first time this week. From this authorization, 385,195 shares are being used in acquiring the assets of Hallcrafters. The remainder will be available for future expansion and other corporate purposes.

According to the plan of acquisition, one share of Northrop preferred will be exchanged for 8.1 shares of Hallcrafters common stock owned

by the Halligan family, which controls more than 50 percent of the outstanding shares. Public shareholders of Hallcrafters would receive one share of the Northrop preferred for each 5.6 shares of Hallcrafters common.

The Northrop preferred shares issued this month will be entitled to cumulative dividends at the annual rate of \$1.45. They will be redeemable at Northrop's option after December 31, 1971, at the price of \$35 per share plus accrued dividends.

After December 31, 1969, each share will be convertible, at the option of the holder, into shares of Northrop common stock at a price to be determined immediately prior to the closing but which will be no less than \$34 nor more than \$45 per share.

In discussing the acquisition, Northrop President Thomas V. Jones said: "After a thorough study and evaluation of the acquisition, we believe it will contribute to the strength, diversity and growth of Northrop. We

(See HALLICRAFTERS, page 4)

## Discounts Planned On Hallcrafters Radio Equipment

The acquisition by Northrop Corporation of the assets and business of Hallcrafters moved closer to completion when, on December 13, the shareholders of both companies approved the transaction.

The planned date of completion was December 20. Assuming that Hallcrafters becomes a member of the Northrop family, Northrop employees will then be able to avail themselves of the purchase of Hallcrafters' commercial products on a direct-factory basis at employee discount prices.

More than 50 commercial products will be offered to Northrop employees, which include all home entertainment receivers, citizens band transceivers, amateur radio products and accessories.



## CHRISTMAS GREETINGS



### To the Men and Women of Northrop:

As the holiday season approaches, I want to express my appreciation to all of you for your efforts in behalf of our company during the past year.

Each year I find it more and more true that one of the greatest satisfactions of working at Northrop is the warmth of the personal associations which so many of us enjoy and the pride we feel in the things we build. Not every company is fortunate enough to have this fine spirit.

Mrs. Jones joins me in extending to you and your families our warmest greetings for the Christmas holidays and our best wishes for a Happy New Year.

Thomas V. Jones  
President and Chairman

### To the People of Northrop Nortronics:

As 1966 comes to a close, we can look back on it as a year of growth, diversification and success—the result of the effort put forth by Norcrafters.

It has been a memorable year for Northrop Nortronics, and today we support more major programs than ever before. We enter 1967 with a firm base which should bring even greater growth.

Mrs. Stevens joins me in wishing you and your families a Merry Christmas and Happy New Year.

Frederick Stevens  
Corporate Vice President and  
General Manager  
Nortronics Division





**CHRISTMAS IN VIETNAM**—Northrop secretary Barbara Hames loads Christmas packages into the family station wagon for shipment to 200 U.S. Army men in South Vietnam. She filled the packages with homemade cookies and

candy, "because I wanted to do something." Miss Hames will be married in May to a member of the unit she sent the presents to. (Photo by Bruce Howell, Santa Monica Evening Outlook.)

## COOKIES TO VIETNAM

### Secretary Plays Santa for Soldiers

She wouldn't deliberately try to upstage Santa Claus, but Northrop Norair's Barbara Hames is probably running him a close second in providing Christmas happiness for the largest number of people.

Miss Hames, a Quality Control secretary, decided in September to send Christmas packages to the U.S. Army's 17th Radio Research Unit in Bien Hoa, South Vietnam.

The fact that there are 200 men in the unit didn't bother her. She just bought extra ingredients for the homemade cookies, peanut brittle and other candies with which she filled 200 boxes.

"There's nothing to it, really," is how she describes the project, but those who have come in contact with her since she began working on it know that isn't so.

"It's a wonderful idea,"

said Howard Butler, also of Quality Control. "I don't know how she found the time or energy to do all she's done."

But Miss Hames minimizes her accomplishments.

"It's something that anybody would have done," she said. "I'm sure lots of people are doing much more for Christmas. I just wanted to show the boys in Vietnam that not all of us here in the states are a bunch of placard-carrying idiots."

Through neighbors who "leaked" the information, the story of Miss Hames' project has found its way into two daily newspapers near her hometown of Culver City.

Her fiancé, Sgt. John Perello, is a member of the unit. At first, Miss Hames was going to send the men a Christmas tree.

"Then I started thinking about it," she said, "and I de-

cided I would send each of the men something. First, I thought of a gingerbread man, but then I figured the packages would be a better idea."

She asked her fiancé to send her a roster of the men in the unit.

"He probably thought I was just going to send cards," she said. "It should be a real surprise for them."

Miss Hames bought more than 200 boxes (she sent extras, to make sure nobody was left out), baking goods, pamphlets depicting the Christmas story, and yards and yards of wrapping paper.

She and her family worked on filling the boxes, and the packages were mailed a few days after Thanksgiving.

Miss Hames and her fiancé plan to marry on May 27. Sergeant Perello is due to be discharged in February.

Miss Hames is a choir director and Sunday School teacher at Culver City Foursquare Church.

### Traditional Holiday Nears; Trips and Parties Planned

One of the most eagerly-awaited periods of the year—the traditional yearend holiday—is now at hand for thousands of Northrop Corporation personnel.

For the majority of those assigned to West Coast operations, it begins with the conclusion of work shifts December 23. It ends when work resumes January 3.

This 10-calendar-day holiday with pay is unique, not only in the aerospace industry, but in all industry.

And as the holiday approaches, Northrop management is exercising every means at its disposal to assure a maximum number of employees are free to enjoy the holiday with their families.

However, the press of business commitments will make it mandatory for some employees to work a part of this period. Both Norair and Nortronics employees will be affected. But they will be a distinct minority.

Too, Northrop personnel assigned to key jobs off-site will

gear their holidays, by contractual requirements, to those of governmental or military agencies they serve. Included are those within the United States, plus others on duty around the world.

However, the vast majority of Northrop people are looking forward to a mass exodus from work stations.

They will leave behind silenced machines and dark offices to be looked after by diligent security, maintenance and services personnel.

To some of the more active the holiday period, or at least a part of it, will afford an opportunity to follow their favorite sport or recreational pursuit.

More than 100 Northrop travelers will wing their way to a sun-filled vacation in Hawaii through NRC Travel Club arrangements.

Anaheim golfers will tackle the Mountain View Country Club links at Corona December 26-27, while Hawthorne area par chasers will try the Torrey Pines layout at La Jolla December 26-27.

(See **HOLIDAY**, page 6)

## NASA Officials Approve Cost Reduction Program

Northrop Corporation's comprehensive Cost and Management Improvement Program (CMIP) has once again been evaluated by National Aeronautics and Space Administration (NASA).

Review of Northrop's cost reduction efforts and the determination that they conform to the rigid standards established by NASA came early this month at a re-evaluation meeting held at Northrop Norair.

This was a re-evaluation in that Northrop passed a similar evaluation one year ago.

Aubrey Smith, chief, and John Miller, deputy chief, of Cost Reduction and Value Engineering at NASA's Marshall Space Flight Center, Huntsville, and George Nash, Cost Reduction monitor at the NASA office, Jet Propulsion Laboratory, conducted the evaluation.

Norair General Manager F. W. Lloyd and T. L. McCarthy, manager of Administration, took part in the opening phases of the session.

Northrop data considered in the evaluation was presented by a team comprised of Ken Davidson of Norair and Ken Hornor of the Corporate office.

The evaluation covered various aspects of Northrop's cost reduction activities carried out in accordance with guidelines established by NASA.

NASA specifies any contractor must successfully pass these evaluations on a periodic or annual basis, in order to be eligi-

ble for a contract which exceeds one million dollars.

Northrop Corporation is one of 39 contractors in the nation presently certified to have met all the criteria specified for in such evaluations.

Northrop also meets the same detailed requirements on all contracts performed for agen-

(See Photo, Page 4)

cies of the Department of Defense. The task of monitoring DOD contracts is carried out continuously through the office of Northrop's Air Force Plant Representative, Lieutenant Colonel R. K. Keeling, and Defense Contract Administration Services representatives responsible for other Northrop activities.

### Executives Attend Seminar Groups; Others Planned

Northrop Nortronics has held initial orientation seminars in a new "Managing by Objectives" program instituted recently.

Twenty-seven Nortronics executives, including General Manager Fred Stevens and Ross Miller, vice president-Technical, attended the first two sessions held in the early fall at Lake Arrowhead.

Eighty-four supervisors took part in a three-day seminar held at the Hawthorne Municipal Airport Building in late October.

Assisting in implementing the program was Dr. John R. Van de Water, a management consultant, and his associate, Don White.

The program features a systematic approach to improving management performance and developing individual executive potential.

"'Managing by Objectives' is a management method which has been installed on a pilot basis on the C-5 program," Mr. Stevens said, "and we will be evaluating results with a view toward possible extension of the program in other areas of Nortronics."

### Bridge Club Members Will Elect Officers

A new Northrop Recreation Club Bridge organization for personnel in the Hawthorne area has selected the first and third Friday and the second and fourth Tuesday for regular sessions at NRC Clubhouse, Hawthorne. The time: 7:15 p.m.

Beginning January 6, duplicate bridge sessions will be played on a regular schedule. Officers will be elected by the club, January 10.



**OBVIOUSLY INTERESTED** in lecture by Dr. John Van de Water, management consultant, are members of Nortronics Hawthorne supervision attending a "Managing by Objectives"

program. Instituted early this fall, program has been confined to key management personnel assigned to C-5 navigation system, but may be expanded to other groups later.



Classified ad service is provided free of charge to all Northrop personnel. Ads for agencies, commercial enterprises and private businesses are not accepted. The Northrop News reserves the right to edit or omit ads.

# Classified

Obtain ad form C67 from organization clerk and mail ad to Northrop News, 170, zone 64. Ads are limited to one item. Deadline is noon Wednesday, one week before publication.

## SHAREHOLDERS (Continued from page 2)

ternational potential we don't explore very thoroughly."

Shortly after Mr. Jones' report, shareholders re-elected him and the other members of the company's 10-man board of directors to another term. Other directors re-elected (with years on board in parentheses) are: James Allen, Northrop vice president and assistant to the president (15 years); Lloyd L. Austin, chairman of the board of Security First National Bank (9 years); Edward W. Carter, president and director of Broadway-Hale Stores, Inc. (11 years); Earle M. Jorgensen, president and chairman of Earle M. Jorgensen Co., a distributor and manufacturer of metals (12 years); Richard W. Millar, a director of Glore Forgan-Wm. R. Staats Inc. (20 years); Robert R. Miller, Northrop senior vice president (10 years); John O'Melveny, senior partner of the law firm O'Melveny & Myers (24 years); A. E. Ponting, director of the investment banking firm Blyth & Co., Inc. (12 years); Albert C. Rubel, petroleum consultant (9 years).

Other major shareholder action included the approval of a plan to acquire the assets of the Hallicrafters Company, Chicago-based manufacturer of electronics and communications equipment, and the authorization of one million shares of a new Northrop preferred stock.

## HALLICRAFTERS (Continued from page 2)

further believe that the growth potential of Hallicrafters will be enhanced by the contributions Northrop can make to the Hallicrafters operation such as added financial, technical, marketing and management resources."

Hallicrafters is a pioneer in the manufacture of short-wave radio transmitters and receivers for use by amateur radio operators. It has broadened its product base to include standard and FM band receivers for the entertainment consumer market, citizens band radio equipment, FM 2-way radio systems, and "Village Radio" systems for communications needs in the developing nations of the world.

Hallicrafters also enjoys an excellent reputation as a supplier of specialized electronic equipment to the military services. More than half (57.6%) of Hallicrafters' current volume of business is with the government.

### For Sale

**House**, 3 baths, 3-bdrm, large rumpus rm., 2400 sq. ft. on 1/2 acre lot, 4 yrs. old, located in La Habra, low down payment if buyer qualifies, Norair Credit Union, Ext. 1117. A

**Pontiac**, 1937 cpe., orig., \$225. Hawthorne, 678-6027. A

**Playhouse**, 6' x 8' redwood, shake roof, \$85. P.V. Estd., 378-3055. A

**Oil Painting**, 24x36, blue & white winter theme in blue & gold frame, \$35. Torrance, 371-9925. A

**Wedding Dress**, bouffant, size 6, \$65. Hawthorne, 671-9306. A

**Honda**, 1966, 305 cc, only 800 miles, \$625. Inglewood, 644-2018. A

**Drafting Machine**, Bruning, w/18" plastic scale, 5 yrs. old, used 1 year, \$65. Lawndale, 675-6803. A

**Volkswagen**, 1961, new tires, \$850. Hawthorne, 679-4237. A

**Dishwasher**, General Electric convt., used 6 months, \$170. Yorba Linda, 714-528-9227. A

**Motorcycle Helmet**, Daytona 300, full protection, cost \$30.; \$25. Canoga Pk., 340-6419. A

**Electronic Equipment**, Eico VTVM model 221 & Heath oscilloscope, model 0-5 w/extended range, \$50 or sell sep. Torrance, DA 6-8273. A

**Trombone**, Olds, 2 yrs. old, \$75. Fullerton, LA 5-9715. A

**Wig**, 100% human hair, dark ash blonde, blunt cut & styled, \$48. Marina del Rey, 823-2655. A

**Accordione**, \$100. Torrance, 326-6195. A

**Corvette**, 1962, 340 h.p., 4-spd., positraction, radio, 2 tops, Michelin 'X' tires, avail. in mid-January, \$2200. Lakewood, 634-8632. A

**Range**, O'Keefe & Meritt, 4 burners, griddle, clock & timer, broiler & storage oven, \$55. Lakewood, HA 1-5128. A

**Pontiac Catalina**, 1959, p/s, p/b, r/h, low mileage, 4-dr. h/top, \$550. Maywood, LU 2-1079. A

**Volkswagen**, 1965 sedan, r/h, s/belts, steel sun roof, 9700 miles, \$1365. Torrance, 326-5731. A

**Radio**, 7-transistor, brown, top grain cowhide cabinet, portable, 6 long-life batteries, \$20. Miraleste, 833-0704. A

**Stove**, Frigidaire, compact 30", \$40. Lakewood, 425-0164. A

**Sunbeam Alpine**, 1960, roadster, o/drive, new paint & tires, engine o/hauled, \$795. Torrance, 321-9225. A

**Flying Club Memberships**, Ercoupe, rental rate \$6.50 per hour wet, \$50. Rolling Hills Estd., 325-3057. A

**Cessna 140**, 1946, metal wing, 400 smoh, 1400 TT, VTR-1 Narco omnigrator, new battery, gen., voltage reg., 20 amp. sys., \$2800. Huntington Bch., 714-536-3217, 213-HA 9-6277. A

**Power Mower**, 18" Rotary, 2-cycle Clinton eng., 3 yrs. old, \$10. P.V. Pen., 378-6655. A

**T-Bird**, 1960, h/top, full power, r/h, good mechanical cond., \$795. L.A., 378-2302. A

**Aquariums**, 10 & 15 gal. w/stand for 15 gal., sub-sand & corner filters, silent, giant air pump, heaters, ceramic hull & arch, plants, gravel & fish, \$45. P.V. Pen., 375-3790. A

**Austin Healey**, 1957, 6 cyl., o/drive, 4-spd., wire wheels, \$575. Inglewood, 675-1664. A

**Piano**, spinet, Story & Clark, mahogany, orig. cost, \$1100; \$375. Inglewood, OR 7-5276. A

**Parachute**, 28' orange & white, new in 1963, modified to double T, also reserve parachute 24', incls. harness, \$50. Inglewood, OR 7-8301. A

**Dodge Camper**, 1965 Sportswagon model, low mileage, V-8 auto. trans., transis. radio, htr., anti-spin 3000 lb. rear axle, hvy. duty battery, many extras, seats 8 as wagon, sleeps 5 as camper, \$3500. Newbury Pk., 805-498-3473. A

**Aircraft**, 1940 Porterfield LP-65, 2 pass., 170 hrs. smoh, needs wing work, \$600. Simi, 805-526-1292. A

**Corvair Monza**, 1961 4-dr., auto. trans., r/h, bucket seats, \$690. Thousand Oaks, 805-495-3649. A

**Pool Table**, 5' x 7' table, balls, cues, triangular rack, \$45. Torrance, 326-9341. A

**Cedar Chest**, Lane, blonde, \$20. Wilmington, 835-3869. A

**Bicycle**, boy's 24" American made, \$15. Torrance, FA 8-3306. A

**Baby Carriage**, imported, hand-crafted, many features, \$25. Torrance, 324-5698. A

**Davenport**, matching chair, by Lawson, \$100. L.A., PL 5-7783. A

**Skis**, poles, bindings, Gresvig 6'3" & boots, women's size 7, \$75. Torrance, 325-9817. A

**Dodge**, 1964 Polara, 4-dr. sed., 383 eng., auto., fac. air, r/h, p/s, p/b, new tires, brakes & shocks, \$1795. Canoga Pk., 340-7752. A

**Home**, 2-bdrm., on large fenced lot, immed. possession, low dn. pymt., \$17,500. Wilmington, FR 5-8778. A

**MGA**, 1958, new tires, \$500. Redondo Bch., 379-4559. A

**Auto Parts** for 1963 Hudson, rear end, eng. & other components, \$10. Inglewood, 672-8629. A

### For Sale

**Plymouth**, 1959 station wagon, new tires & brakes, \$295. Gardena, DA 9-4402. A

**Ford Falcon**, 1962, good paint, new engine & radiator, \$550. L.A., 389-3029. A

**Bookcase**, small, green, antiqued, \$5. Hawthorne, 676-3883. A

**Silverstone**, 21" TV, w/stand, \$10. Tarzana, 345-6391. A

**Helmet**, Fury, w/tinted face shield, size 7 1/4, orig. cost \$46; \$30. Hawthorne, 676-3912. A

**Ford Falcon**, 1965, sprint, V-8, auto. trans., p/s, factory air cond., r/h, \$1995. Huntington Bch., 714-842-6720. A

**Bicycle**, 15-gear Schwinn racer, orig. price \$120; \$50. L.A., 670-6017. A

**Rambler**, 1965 station wagon, model 550, 3-pd., 6-cyl. r/h & w/take over \$86 mo. pymts., \$1299. Anaheim, 714-535-6712. A

**Mustang**, 1966 deluxe 2-dr., vinyl h/top, 225 h.p. V-8 w/air cond., Cruise-O-Matic trans., p/s, self-adjust. p/b, htr., radio w/long range antenna, bench seat, s/belts, w/s/w tires, wire wheel covers, 9600 miles, within warranty, \$2895. San Pedro, 831-5283. A

**Sailboat**, 19' O'Day mariner, keel, mahogany bulkhead, o/board, boom tent, new bottom paint, sleeps 2, \$2250. Torrance, 371-6240. A

**Mustang**, 1965 h/top, r/h, auto. trans., low mileage, \$2000. L.A. 837-4596. A

**Movie Camera**, Keystone, grip, projector 8mm. & screen, \$50. L.A., 670-6531. A

**Pup**, purebred German shepherd, female, 4 mos. old, shots, \$50. Canoga Pk., 341-4965. A

**Tires**, 2, 7.35x15 black wall, \$15. Gardena, 323-3675. A

**Organ**, Hammond, model B3 w/HR-40 tone cabinet, \$1600. P.V. Pen., 377-5415. A

**MGB**, 1964, 30,000 mi., r/h, wire wheels, tonneau cover, s/belts, \$1725. L.A., 383-4953. A

**Electric Train**, HO, board 4' x 8', elec. switches, 3 trains, buildings, tunnel, \$45. Hawthorne, 676-9899. A

**Guitar**, Gibson classical, Spanish decor, orig. cost \$150, incls. case & music, \$100. Inglewood, 671-5576. A

**Aquariums**, 2 5-gal. w/2 filters, dble. stem valve & pump, w/guppies, \$10. Redondo Bch., 379-8888. A

**Volkswagen**, 1963, sedan, w/w tires, Becker Monte Carlo radio, \$1050. Huntington Pk., 589-8746. A

**Mercury Meteor**, V-8 1962 2-dr. sedan, p/s, p/b, r/h, 1-owner, 45,000 miles, \$650. Pac. Palisades, GL 4-5985. A

**TV**, Zenith 19", portable, w/stand & remote control, \$75. Oxnard, 486-0873. A

**Piano**, baby grand, good quality, dk. brown, w/bench, \$395. San Pedro, TE 3-4191. A

**Mobile Home**, 1965, 2-bdrm., 10' x 53' Van Dyke, completely furn., cpts., dps., washer, bltins, storm windows, take over \$87 mo. pymts., \$650 needed for \$2000 equity, \$4800. Torrance, 835-6975. A

**Comb. TV**, stereo, radio, Magnavox, 25", walnut cabinet, 5 yrs. old, \$150. P.V. Estd., 377-3642. A

**House**, 3-bdrm., patios, fireplace, beam ceiling, \$28,000. Manhattan Bch., 545-6321. A

**Volkswagen**, 1963, 1500 sunroof, \$1050. L.A., 479-3343. A

**Wonder Horse**, large, \$10. Inglewood, PL 6-7337. A

**Volkswagen**, 1961 sedan 1300, w/s/w, radio, s/belt, 55,000 miles, \$895. Box 2501. A

**Formal**, full length, size 9-10, lime green, sleeveless, \$20. Redondo Bch., FR 4-8719. A

**Lens**, Nikkor, auto. 28mm F/3.5 for Nikon F camera, never used, cost over \$175, \$90. Box 2502. A

**Oldsmobile**, Holiday Super 88, 1963, air cond. & power, \$1600. Inglewood, 671-6550. A

**Chevrolet**, 1958 4-dr. station wagon, r/h, auto. trans., \$225. Gardena, OS 5-2159. A

**Refrigerator**, Kelvinator, cross-top freezer, \$55. Inglewood, 672-5798. A

**Oldsmobile**, 1960, r/h, p/s, p/b, \$595. Inglewood, 674-4192. A

**Camera**, Kodak Brownie, 35mm, \$20. Torrance, 371-6817. A

**Plymouth**, 1959 Fury sedan, good tires & brakes, \$350. L.A., 645-8557. A

**Pontiac**, 1963 Grand Prix, factory air, r/h, p/b, p/s, alum. wheels, low mileage, \$1750. Huntington Bch., 714-847-0648. A

**Valiant 100**, 1965, 225 cu. in., 170 h.p. Slant 6, 4-dr., auto., r/h, new Firestone 500 tires, brakes & elect. tune-up, \$1595. Redondo Bch., 371-9724. A

**Airplane**, Bonanza C-35, TT 1500 hrs., 700 smoh Narco MK10, M12, MBT & Lear ADF 12E2, 20-gal. aux. tank, air cond., oxygen kit, many other extras, \$13,000. Gardena, 329-4171, 329-5103. A

**Chevelle**, 1964 Malibu S.S., 283 cu. in., Power Glide, p/s, oval astros & locking knock-offs, new tires & bat., Motorola solid state vibrasonic, \$1800. Gardena, 329-4765. A

**Honda**, S-90, 1-yr. old, dual mirrors, lug. rack, helmet, tool kit, cost \$450; \$300. San Pedro, TE 3-4272. A

**Oval Rug**, braided, 11 x 14, shades of green & brown, just cleaned, \$30. Lynwood, 632-8696. A

**Oldsmobile**, 1960, Super 88, p/s, p/b, \$450. Lawndale, 675-2305. A

### For Sale

**DeSoto**, 1960 2-dr. h/top, Adventurer, full power, incl. windows, \$595. Harbor City, 326-1856. A

**Boat**, Evinrude Sport 16, 1965, 90 h.p., fully equipped, Velmar water skis, Evinrude trailer w/elec. brakes, take over approx. \$70 mo. pymts., \$2600. Norwalk, 864-9661. A

**Lot**, lge., 180° unobstructed view of ocean, in P.V. Estd., \$1000 dn. or more at option of buyer, will carry bal. at 6%, \$12,000. Rolling Hills Estd., 377-0146. A

**Table**, 6' portable, Samsonite, \$30. Anaheim, 776-1322. A

**Rug**, 12 1/2 x 19, green wool, \$50. L.A., GR. 4-7895. A

**Oldsmobile Engine**, 1956, new rebilt., bored 371 cu. in. dual quads, alum. valve covers, \$250. Norco, 737-1081. A

**Home**, deluxe custom on 1/3-acre, 3-bdrm. & family rm., 2-bath, 620 sq. ft. covered patio, cust. rock fence & drive, room for horses, \$37,950. Santa Ana, 532-2691. A

**Organ**, Thomas, electronic transistorized Serenade, ebony, matching bench, 2 keyboards, 25' pedals, Leslie speaker plus 3-12" speakers, 3 yrs. warranty on tone generators, many extras, terms, cost \$2100; \$1099. Hawthorne, 679-4365. A

**Tape Recorder**, 4-track stereo record. & playback, 2 microphones, & stands, Silver-tone Medalist, \$150. Buena Pk., UN 3-2769. A

**House**, 3-bdrm., fireplace, dining rm., sun porch, dble. lot, heated pool, large walled patio, 24x24 detached rec. room, w/bar & fireplace, dble. gar., dble. parking apron, 15 min. to Northrop, \$37,500. Manhattan Bch., 374-8744. A

**Shopsmith**, Mark V, all standard acces., plus jointer, \$180. Torrance, DA 3-1026. A

**Water Softener**, Cal-Ever, used 6 mos., \$250. Lakewood, 867-0855. A

**Pups**, German shepherd, silver grey, \$60. Malibu, GL 7-2688, GL 7-7621. A

**Pool Table**, 3 1/2' x 7', complete set of balls, 3 cue sticks, rack, \$65. Manhattan Bch., FR 2-6916. A

**Chevrolet**, 1964 Bel-Air, 4-dr. sedan, r/h, w/s/w tires, auto. trans., 283 cu. in. eng., 21,867 miles, \$1200. Hawthorne, OS 5-3165. A

**Organ**, Hammond M-3 spinet w/percussion, unmarred maple finish, \$750. San Pedro, 831-5837. A

**Bible**, King James version, never used, cost \$75; \$50. Hawthorne, 675-0795. A

**Tire Chains** for VW, used once, \$5. L.A., 645-1274. A

**Mustang**, 1965 2+2 fastback, auto. trans., p/s, p/b, 16,000 miles, \$1900. Bel Air, GR 2-3938. A

**Swing Set**, children's, \$10. Redondo Bch., 379-1049. A

### Wanted to Buy

**Palos Verdes** stone, will cart. Redondo Bch., FR 9-3134. B

**Butane Tank**, 5-gal. & regulator. Long Bch., 596-3691. B

**Tenor Saxophone**, must be in good condition. Long Bch., GA 3-1363. B

**Car Radio** for Volkswagen. Simi, 805-526-7767. B

**Stove**, apartment size, good condition. Box 2503. B

**Stereo System**, Scott 344B pre-amp. & tuner, Benjamin Miracord turntable, K.L.H. model 175 speakers. P.V., 378-3223. B

### For Trade

**Boat**, 16' Wizzard, 35 h.p. motor & trailer, trade for 16' or 17' travel trailer. Gardena, DA 4-7623. C

### Rentals Offered

**Exec. Apt**, 2-bdrm., 2-bath, 1600 sq. ft., lux. features, \$200 mo. Inglewood, 670-6084. E

**House**, 3-bdrm. & fam. rm., fireplace, bltins, dishwasher, cpts., dps., fenced yard, 2 yrs. old, in Huntington Bch., \$155 mo. Torrance, DA 9-9464, DA 7-8994. E

**Vacation Cottages**, Idyllwild, 1 & 2 bdrm., fireplace, stream, patios, \$20-\$35 w/ends; \$45-\$70 wk. L.A., PL 4-5288. E

**Apt**, 1-bdrm., furn. cpts., dps., bltins, air-cond., convenient to frwys., 20 min. to Norair, \$110 mo. W.L.A., 391-7781. E

**House**, 4-bdrm., fenced yd., patio, 2 fireplaces, family rm., kitchen w/bltins, close to schools, 1 yr. lease req'd, \$245 mo. P.V. Pen., FR 7-8856. E

**Apt**, modern, 3-bdrm., furn. \$135 mo. N. Long Bch., 422-4022. E

**Apt**, 2-bdrm., unfurn., redecorated, 1 mile to Norair, near schools, churches, stove & refrig. avail., \$75 mo. Long Bch., 424-0590. E

**House**, 3-bdrm., 2-bath, furn., dble. garage, close to frwys., \$150 mo. Gardena, 422-5919. E

**Apt**, 2-bdrm., unfurn., bltins, cpts., dps., closed gar., pvt. patio, laundry, hobby shop, hot water & trash inc., \$125 mo. Torrance, FR 5-0867. E

**Cabin**, Big Bear Lake, sleeps 7 to 9, \$18 w/end; \$50 wk. Bellflower, TO 7-0662. E

**House**, 3-bdrm., avail. January 1, \$145 mo. Gardena, 635-3127. E

**Home**, 3-bdrm., 2-bath & den, fenced yd., 3 children acceptable, unfurn., Orange County area, \$155 mo. L.A., 213-391-5685. E

**Apt**, 2-bdrm., 1 1/2-bath, cpts., dps., bltins, near schools & recreation, \$125 unfurn.; \$155 furn. Inglewood, 644-2565, 672-1890. E

### Rentals Offered

**Apt**, 2-bdrm., cpts., bltin. oven, range, birch cabinets, thermo heat, garb. disp., TV, washer & dryer hook up, gar., child's play area, water and trash pd., \$105 mo. Torrance, 320-2827. E

**House**, walk to work, 3-bdrm., service porch, cpts., dps., stove, encl. patio, 2-car gar., close to all schools, avail. January 1, \$165 mo. Hawthorne, OS 6-6006. E

**Owner's Unit**, deluxe, 3-bdrm., 2-bath, stove, refrig., dishwasher, forced air furnace, AM-FM & inter-com. fireplace, pvt. patio, dble. gar., near Northrop, \$250 mo. Hawthorne, OS 9-7123. E

**Apt**, 2-bdrm., furn. & unfurn., cpts., dps., bltin stove, lower, walk to Nortronics Anaheim, \$110 & up. Fullerton, 526-3053. E

**Apt**, lower 2-bdrm., 2 blks. to Norair, cpts., dps., stove, bltins., no children, no pets, \$115. mo. Hawthorne, OS 6-7417. E

### Rentals Wanted

**House**, 3-bdrm. or apt, near Norair, will take 2-bdrm. if it has back porch or small extra room, able to take care of yard for discount in rent. Inglewood, 672-4486. F

### Lost

**Diamond Wedding Ring**, man's, 2 diamonds mounted in gold, lost Friday, 12/9/66, N.V. plant, \$25 reward. Calabasas, DI 0-9997. J

### Personals

With sincere appreciation we extend our heartfelt thanks to all our friends at Norair for their concern & expressions of sympathy during our recent bereavement. OTTO & DOROTHY WALLS & FAMILY. L

We wish to express our deep appreciation to all our friends for the many thoughtful ways they expressed their sympathy at the recent passing of our mother & grandmother. ETHEL MEEKER & RICHARD GOHLBECK. L

### For Sale or Trade

**Home & Income**, 5-bdrm., 2 1/2 bath, Spanish style w/ paneled bar & den, lge. open beam living rm., covered patio, basement, plus 10 furn. units, 5 2-bdrm. & 5 1-bdrm., has \$77,000 1st T.D., owner will carry 2nd, \$152,000 or trade for property in West L.A. Hollywood, HO 4-1084. M

**Acres**, 5-acre bldg. site near Rosamond, \$3450 or trade \$1500 equity for car, bal. \$1950 at \$20 mo. inc. 6% interest. Torrance, FR 8-1026. M

**Train Set**, transformer, track, locomotive, cars, & log loader, Lionel O gauge, \$25 or trade for HO train set. P.V. Pen., 377-5862. M

## Rides and Riders

### Rides Wanted

7 a.m. — 3:42 p.m.

**El Segundo & Hawthorne Blvd.**, Hawthorne. Corine Medel, Norair, ext. 2075. B

7:30 a.m. — 4:12 p.m.

**Wilshire & Bundy** to Hawthorne. Jack L. Wise, Norair, ext. 1444, 479-3343. B

### Rides Offered

7:30 a.m. — 4:12 p.m.

**Wilshire & Bundy** to Hawthorne. Jack L. Wise, Norair, ext. 1444, 479-3343. B

## Campers Schedule Salton Sea Visit

The Northrop Wanderers Camping Club will hold its annual yearend campout at the Salton Sea, from December 26 through December 31.

Further information may be obtained by contacting Commissioner Frank Byers at Norair, Ext. 2669 by December 23.



**TALKING COST REDUCTION** — Norair's Ken Davidson (center) and Ken Hornor of the Corporate office (right) present Northrop data to a NASA team conducting an evaluation of Northrop's CMIP efforts. They are (from left) John Miller, Aubrey Smith and George Nash. Northrop passed detailed evaluation.



# Nortronics youngsters meet

## SANTA

Photos by Ron McGaffin and  
Chuck Ramsey



*SANTA'S HELPERS, the traditional elves, passed out candy canes Sunday as Nortronics Anaheim children were treated to a Christmas show. Above, Santa talks with an attractive Nortronics employee who may have asked him for a mink coat or sports car for Christmas. Below, he engages in a man-to-man conversation with a young man whose requests probably were more conventional.*



*AN ESTIMATED 10,000 youngsters and their families, both from Norair and Nortronics, gathered in Hollywood's Palladium (above) on Saturday for the annual NRC Christmas show. While some youngsters talked with Santa's helpers, others (above), at the Nortronics Anaheim show engaged in less traditional Christmas activities, such as pony rides. Both shows drew record turnouts, NRC officials said.*



## Canadians Meet, List Parts Needs

Twenty representatives of the Canadian government's Materiel Command (MATCOM) have concluded a two-week conference at Northrop Norair on spare parts requirements for the Canadian version of Northrop's F-5.

The men—both military and civilian personnel—were from MATCOM headquarters in Ottawa, Ontario, the Canadian capital. The meeting began on November 28 and continued through December 9.

In establishing their spare parts requirements, the men reviewed documents prepared by Norair's Logistics section. The requirements were established to support the operational program for the CF-5 aircraft.

The conference was the second held at Norair on the CF-5. The first, from September 19 through 22, emphasized requirements on "high value" and long lead-time spare parts and aerospace ground equipment.

"The provisioning conferences were held in stages," according to Tom Lancaster, supervisor of Norair's Logistics Documentation group, "because of the limited lead time we had to work with."

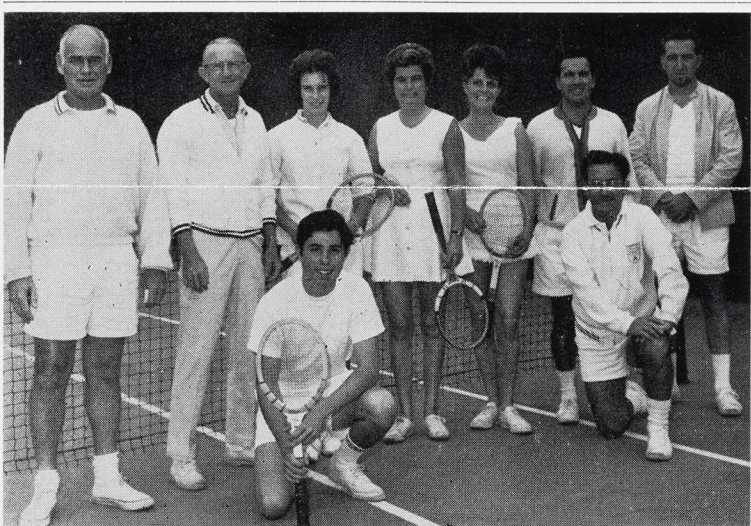
Mr. Lancaster coordinated both conferences. Chairman for the first meeting was MATCOM's Alex Milne. Carl Bourgeois chaired the second conference. Norair's counterpart for the September session was Jack Nation, and Gabe Sady for the second.

In all, eight Norair men worked with the Canadians during the conference, making support recommendations for spares orders.

The Canadian version of the F-5 is being built by Canadair of Montreal, under license to Northrop.



PLANS OF THE CF-5 are studied by Flight Lieutenant G. L. Lees (left) and Flight Lieutenant E. F. Pearson, both of the Royal Canadian Air Force. The men were among 20 Canadians studying CF-5 parts requirements in a two-week conference recently at Northrop Norair.



TENNIS TRAVELERS—Although 85 NRC tennis enthusiasts journeyed to La Jolla for a weekend of fun, only a few could be found at one place at any given time. This group, snapped on the courts, include (left to right) Jim McKanna, John Potts, Dorothy Neatrou, Dorothy Milne, Maxine Lewis, Floyd Hraný and James Nimeshein. Kneeling, Mike Reed and Russ Black.

## Traditional Holiday Nears; Trips and Parties Planned

(Continued from page 3)

ber 28-29.

Bowlers will try for strikes at an all-Northrop Christmas tournament December 30-31 at Gardena Bowl.

Over the past weekend, the emphasis was on the young at two NRC-sponsored children's parties held in Hollywood and Anaheim.

Antelope Valley employees held their annual children's party December 18. And on December 17 Norair's Palmdale adults met for their annual dance, while across town those from Edwards Air Force Base were tripping the light fantastic at the Sands Bowl, scene of their annual dance.

Northrop personnel at NASA's Ames Research Center, Mountainview, joined their NASA friends at a children's Christmas party December 17.

December 17 was also "children's day" at Huntsville, Alabama, when Northrop families feted the youngsters. This was followed by a December 21 dance for adults at the Officer's Club at a local installation.

Amid the many last-minute details, all employees are urged to spend a few minutes preparing for the long absence from work. Take down decorations, unplug electrical appliances, typewriters and other potential hazards.

## \$3 MILLION CONTRACT

### Nortronics to Produce C-5A Computer Systems

A contract for approximately \$3 million has been awarded to Northrop Corporation by the Lockheed-Georgia Company, Marietta, Georgia, for airborne computers for the U. S. Air Force C-5A military transport airplanes.

Northrop's Nortronics Division will produce the 67 computers at its Hawthorne facilities. The computers will be used in the Lockheed-designed Malfunction Analysis Detection and Recording (MADAR) system which will monitor all major C-5A systems.

The Nortronics computers are extremely lightweight, but have all the computational capability of large data processing machines.

Earlier this year, Northrop received a contract from Lockheed-Georgia for the development and production of the C-5A inertial-doppler navigation equipment. The C-5A will be the first cargo plane to com-

bine both doppler and inertial systems. Included in this system will be Nortronics airborne computers, similar to those that will be produced under the MADAR award.

Nortronics also is providing integration of all elements of the aircraft guidance system under contract to Lockheed-Georgia.

### Radio Club to Offer Morse Code Class

Northrop Radio Club will launch a new series of classes in Morse code and radio theory immediately following a brief business meeting set for 5 p.m., January 9, at NRC Clubhouse, Hawthorne.

Nilan Kincaid, ext. 1631 at Norair, will instruct the session aimed at aiding those interest in obtaining either novice or general class amateur operator's licenses from the Federal Communication Commission.

## POLARIS PROVIDES BACKGROUND

### Poseidon Meets Schedule

Reliability, design flexibility and production experience.

These are the ingredients contributing to the on-schedule progress of Nortronics' checkout equipment for the Navy's Poseidon missiles.

Engineers at Nortronics' Anaheim facility are developing a new Missile Test and Readiness Equipment System similar to that designed for Polaris A1, A2 and A3 missiles.

"Thanks to our previous experience with Polaris, we're making good progress with the Poseidon system," said Program Manager Daniel T. Chung. "And this is in spite of the fact that the new system must monitor a unit several times more complex than Polaris."

Nortronics' present success goes back even farther than 1959—the date the first Polaris missile checkout equipment was delivered to the Navy.

In 1957, a company-funded research program resulted in the design of DATICO (Digital Automatic Tape Intelligence Checkout). DATICO was conceived as an expandable building block on which any number of test and monitoring systems could be built.

The concept was proven sound when the Navy asked Nortronics to build a checkout system for the first Polaris missiles. Called the Type C, it was designed, built and delivered in the short span of five months.

From this system grew the integrated logistics of the Polaris program. The same basic test equipment is used to check the missile throughout its existence—from factory to submarine to supply tender to maintenance depot and back to the submarine.

"This approach," said Mr. Chung, "insures high standards of operational readiness."



EXAMINING SOME OF THE WIRING components of the Door Mounted Junction Panel for the C3 Poseidon MK 2 and MK 3 monitoring system produced and designed by Nortronics are Daniel T. Chung, Polaris/Po-

seidon program manager, and Maurice A. Seeley, chief, Electronics Assembly and Test. (L. to R.) Elsie Banion, wiring assembler; Genevieve M. Hannah, wiring assembler; Mr. Chung and Mr. Seeley.







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